

PLTL

SPECIAL ISSUE

Making PLTL
FUN

Does that
come with
Freys?

An exclusive interview with
Dr. Frey, the world's leading
expert on PLTL

8

EASY WAYS
TO HAVE THE
BEST PLTL
OF YOUR LIFE

ALSO

- Achieving balance
- *YOUR FIRST TIME:*
What to expect

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Interview with Regina Frey

Interviewer: Dr. Frey, Washington University has been organizing PLTL study groups since 2002. Tell us, how did PLTL get started at Washington University, and what is a PLTL study group?

R. Frey: PLTL at Washington University started with General Chemistry. The instructors had been suggesting to students in General Chemistry to study in groups for many years. What we did not realize was that students did not really know how to study effectively in groups and that we needed to teach effective group study. PLTL is a nationwide program that was developed in 1993 under an NSF grant; the national website can be found at <http://pltl.org>. (Washington University also has a PLTL website at <http://ascc.artsci.wustl.edu/~teachcen/pltl>.) The PLTL method was shown to be successful in General Chemistry at other schools and we determined this method could be easily modified to fit into our current course structure. Therefore, in 2001, we started a pilot group, with the full PLTL program beginning in 2002 for General Chemistry. Then in fall 2004, the Calculus and General Physics courses started PLTL groups.

What is a PLTL study group? A PLTL study group consists of six to eight students facilitated by a student (peer) leader. These groups meet once a week during the semester for a two-hour workshop. Each study group works together on prepared problems that are complex and designed to be solved cooperatively, with the PLTL leader facilitating the group. The leader does not solve the problems with the students in the study group, but guides and encourages them as the group solves the problems. The PLTL model fosters an academic community for the students, and encourages them to take responsibility for their own learning.

Interviewer: Since this issue is for the first-time peer leader, can you describe the perfect PLTL session for us?

R. Frey: First, a perfect PLTL session does not exist. However, there are many characteristics of a session that makes the group work well. Some of these features are: having the students discuss the solutions, asking and answering questions among themselves, and deciding together whether the answer is correct or not. In a group who has reached the performing stage in group dynamics, the students will: come in prepared and ready to work on the problems; make sure each member understands the problem before moving onto the next; and not work ahead. There will be an air of cooperation and a sense of community during the session.

However, I need to stress that no group starts at the performing stage. Actually, there are four stages that a group goes through with the performing stage being the final one. Peer leaders learn about these stages and how to encourage the group to move through these 4 stages of group dynamics. Groups take most of the semester to reach the performing stage, and groups will not progress steadily through each stage.

Interviewer: What does the peer leader do in these sessions, and how does the leader affect the dynamics of the group?

R. Frey: Hmm....Good questions, and ones that are difficult to answer. Being a leader is knowing how to be involved and yet not too involved. A peer leader facilitates the PLTL study groups; he or she is not a tutor or teaching assistant. The peer leader position

incorporates multiple roles such as motivator, guide, task-master, group builder, coach, mentor and role model.

Peer leaders affect the group dynamics by setting the tone for the discussion. For example, individuals' comments are respected; criticism among the students is constructive; and all members have an equal opportunity to participate. The peer leader is responsible for the process - that is, structuring the session, keeping the discussion on track, encouraging proper interaction between members, and developing consensus. As the group dynamics develop, the students become empowered to take control of their own learning.

Interviewer: This model sounds wonderful, but getting the group to reach the performing stage seems very complicated and slightly mysterious. How do these peer leaders learn to facilitate a session and help the group move through the proper stages of group dynamics?

R. Frey: There is training for the new peer leaders during their first semester where they learn how to facilitate a group. Also, all of the peer leaders within a discipline meet once a week to work the problem set for the week in groups. These are the main opportunities where new peer leaders learn to facilitate groups. In addition, in this issue, this year's peer leaders have written essays giving tips to the new peer leaders. The peer leaders picked 8 different topics to discuss: knowing your role; structuring your session; tips for the first day; academic approaches; group dynamics; diversity; maintaining a good attitude; and making PLTL fun.

Interviewer: Any tips that stand out from these essays?

R. Frey: The essays are filled with great tips, and reassurances, from the experienced peer leaders. I could not mention all of the wonderful ideas. However, I will give a few to spur your interest: “Goof off a little”; “Be daring and try different things out”; “Each group member contributes an element to the PLTL dynamic”; “Discuss”; “Be enthusiastic”; “Be flexible”; “Call students by name”; “Food works”; “Draw a map”; “PLTL is like a box of chocolates.”

Interviewer: The last tip intrigues me. Any words of advice from you for the new peer leaders?

R. Frey: Well, we talk about specific ideas in the SAM course during the peer-leaders’ first semester. Therefore, I will just ask the new leaders to remember why you liked PLTL and wanted to be a peer leader. Do not be afraid to how your PLTL group your passion for the subject. Develop your own style of peer leading and make your group your own. Most of all enjoy yourself at these sessions, and then your students will too.

Interviewer: Thanks for chatting with me. To all the new peer leaders, enjoy the essays.

Know Your Role by Meng Huang

As a PLTL leader, it is essential to know your role. A leader is supposed to facilitate a dynamic group learning process; the key word is “facilitating”. Students unfamiliar with PLTL and its philosophy often misconceive that PLTL is basically an additional discussion section for a class in which a mentor re-teaches the students concepts that have already been covered in class. While a PLTL leader does provide academic reinforcement, he or she does not actually teach the material. The purpose of PLTL is to promote group learning, thus, as PLTL leaders we must devise strategies specific to our own unique groups to encourage them to find the answers among themselves. It is only after the group has explored various paths, whether they are correct or incorrect, that each member will gain a deeper understanding of the material at hand.

Because most students join PLTL with little understanding of the philosophy behind it, they habitually see the leaders as answer keys to the problems, similar to teachers. It is crucial from day one to wean them from this habit by establishing the ground rules of PLTL with special emphasis on the fact that you will not divulge any answers. I made the mistake of starting out my first session without stressing the fact that I would not give answers at all, so when they turned to me with confused blank stares they were shocked and rather appalled that I refused to give them the answers. I felt that this was an initial damper to the developing relationship I had with the group because it seemed to me that they perceived me as an incompetent fool unprepared to “teach” them. Intuitively during your first sessions, you might be tempted to give your group the answers to let them work back from, but just remember, they will get much less out of that than if they actually come up with the solution among themselves.

After your group members accept the fact that you will not give them the answers, the next step is to learn how to lead them in the right direction. Personally, I prefer to first let them work through the problem using their own methods, even if it takes them far from a correct path. When they make their mistake, they will approach the problem from a different angle, but if it and all subsequent attempts fail, you must be prepared to facilitate. I like to prompt the group at the step in which they made their mistake and ask them to run through their logic out loud. This encourages them to reevaluate their choices, which usually allows them to catch their own mistakes. If that does not clear the mental roadblock, another strategy to try is to hint at what they should be trying to do. If difficulty in analyzing the problem still persists after all the above measures have been taken, I often find it helpful to just open up the book and notes and have the group members take turns going over the concepts behind the problem out loud. These are some of only a few strategies to use when leading your group.

Your role as a PLTL leader is defined by your own actions. Observe your group carefully and learn from your experiences because you must adapt to your group's learning style(s) and dynamics and face new challenges with your own unique strategies.

Knowing Your Role by Myrtle Karam

The role of a leader, my dole of a reader, lode of a dearer, rode of a dealer; the problem is that the role of a PLTL leader is often unclear and imprecise. To unscramble the puzzling definition of the leadership role, remember that the definition is not exact. Leaders must be reflexive and adapt to the many different situations that arise during PLTL session. The leader's place among the group is constantly scrambling and the leader must alter their role constantly. To everything, there is a season. (Turn, turn, turn). There is a time to rule with an iron fist, and a time for leniency. There is a time to ignite social interactions and a time to squelch side conversations. There is also a time for the leader to allow his or her group to view him or her as a peer, and a time to distinguish himself or herself from the rest of the group. There is no black/white for the juxtaposed roles of mentor/tutor, peer/supervisor, and overseer/participant. Balancing the leadership role can often be even more difficult when a leader knows someone in his or her group as a friend prior to knowing them in a PLTL setting. This adds another dimension to the leadership role, for the rest of the group will know you as leader first, then become your friend. For that particular group member, the relationship is reversed with them knowing the leader first socially then eventually accepting and growing to respect the leader as a mentor. The group member might feel a proprietary sense in the group since they know the leader personally. This might cause disruptions as they feel more comfortable interrupting the group and less inclined to respect your role as leader. They might also get more of your attention since you know them on a personal level and other members of the group might intrinsically feel left out of you and your friend's obviously stronger bond. Also, the leader might feel uncomfortable enforcing rules on

his or her friend and might feel uncomfortable enforcing regulations. This extreme case points out how important it is to balance the role of friend and leader, with neither role entrenching on the other. Although it is natural for you to want acceptance from your group as a peer and for your group to like you, it is important to not allow the friend role to hinder your enforcing of rules.

The group dynamic is aided by the fact that the leader is a peer as well. The leader is not only fresh with the material but is temporally closer to the experience of taking the class and can often offer words of advice from a shared perspective. It is often that a leader will know group members from taking classes with them or from social environments. Knowing when to be a peer and when to be a leader is important.

Leaders should look to the group itself for cues on how to act. Similar to LeChatlier's principle in chemistry, if the equilibrium of the group is disturbed, it is the role of the leader to shift the equilibrium to counteract the effects of the disturbance. If the group is not socially interacting, the leader must introduce conversation. If the group is digressing on side conversations, the leader must be strict and refocus attention to the problem set. If the group is moving too quickly the leader must slow their pace, and speed it up when it slows too much. There are many equilibria in the group dynamic that must be maintained and the role of leader must change to keep the group stable ($\Delta G=0$).

The role of the leader can never strictly be defined for it is dependent on the role of each group member. Each group member contributes an element to the PLTL dynamic and the most important thing for the leader to remember is that they must constantly adapt to the given situation and balance roles without one defined role ever becoming overly dominant.

Knowing Your Role by Kristen Rao

Being self-aware is one of the most important aspects of leadership. For a PLTL leader, this is particularly important in keeping with the PLTL philosophy. As a leader, you must be constantly aware of your role within the group. This is often easier said than done; after all, you are a student, just like members of the study group. At the same time, you are a mentor and a role model who must be respected in order for the group to function properly. It can be difficult to judge where to draw the line between peer and leader and find a balance that is healthy and beneficial to the group dynamic. With experience, you will learn how to best accomplish this within your own group. The following are some pieces of advice to bear in mind.

As a PLTL leader, it is vital that you befriend your students. Forge personal relationships with each and every student and take an interest in the students' lives. I recommend just sitting and talking to them for the first few minutes of the PLTL session, before you distribute the worksheet. In many cases, they will be freshmen, so ask how they are enjoying college life. Gradually shift the conversation towards academics. Ask how their classes are going, paying special attention to comments about the subject for which you are their leader. Ask in particular about this subject. Recall your memories of the subject and how you felt the first time you were exposed to the material. This makes it easy to relate to the students when they feel stressed or do not understand a topic.

Second, remember that you are not an answer key. The purpose of PLTL is to foster group learning. You are a group facilitator who happens to have done well in the course. A key role for a leader is to sit back and observe. Be prepared for the students, especially those who have not been involved in PLTL previously, to expect you to have

all of the answers. From the first session onward, encourage students to talk to each other, and try not to give them answers. Giving answers is risky for several reasons. For one, it has likely been almost a year since you have seen the material and you do not want to give incorrect information. Also, students benefit greatly from figuring things out as a group and learning from each other. Not adhering to this guideline undermines the purpose of PLTL and causes the group structure to deteriorate.

Be a role model for your students. Create an atmosphere of encouragement and mutual respect. By respecting each group member, you will earn their approval and often, they will look up to you. Encourage group members to respect each other by setting a great example. Listen to what everyone has to say and give time and considerations to each student's questions. Also, work hard and they will follow your example. Be actively involved in the problem by asking questions to challenge students' understanding.

Finally, be aware of your role as a referee of sorts. If a problem arises, it is better to confront it than to let it build and alter the group dynamic. Keep the group on track and make sure everyone is working on the same problem. Stress the importance of attendance and hold the students accountable. Do not be afraid to confront a student one-on-one to discuss an issue. Being an active leader helps to solve issues and prevent potential problems from arising in the future.

There is much to remember as you embark upon your journey as a PLTL leader. Figuring out your role is difficult because there can be quite a bit of gray area. Part of the process of becoming a good leader is learning from experience. While I recommend that you keep in mind your roles as friend, facilitator, role model, and even referee, my number one piece of advice is to learn from both your successes and your mistakes.

Knowing your Role: Being Awkward and Using it to your Advantage
by Dan Tilden

PLTL is an adventure. You will be guiding students through a subject that they are just learning. You will be a big part of how well they end up learning the material, and ultimately how well they do in the class. PLTL is a place where many students solidify their understanding of the material and begin to unify and connect all of the material that they have learned throughout the year. This makes the job of a PLTL leader a very important one. At the same time, however, PLTL must be fun for it to keep the attention of your students lest they get bored and stop coming to the session. With all of these responsibilities it may be tempting to try to appear as some omnipotent ruler of your subject matter. In my opinion this is one of the worst things that you can do as a PLTL leader. The most important aspect of being a leader is to be yourself.

Being yourself seems like such a no-brainer that you may not think that it is something that you have to concentrate on, however, if you think back to when you were a PLTL group member and think about your leader, hopefully you don't think of him or her as some knowledge robot, but rather a person who made mistakes and who was willing to discuss and explore the subject matter with you. Hopefully they were wrong sometime during the semester. All of these things make the leader more human and ultimately more approachable in the group. It helped me to integrate better into my groups and to become a better leader. Being myself was a key part in my development as an effective leader.

The first session that I led, I believe, effectively illustrates my points. I came to the session utterly unprepared for leading the group. I had done the problem set the previous Friday, and did pretty much nothing until it was time to have the first session. It

was suggested that we go over the PLTL philosophy and have an icebreaker with our group members before we start the problem set so that there we a set of expectations that the students would have for the group and so that they could get to know their fellow group members. I was so nervous about the whole thing that I completely forgot about all of that when I got to the session and started the session by passing out the problem sheets. Just by chance, I decided that since I didn't know everyone's name I should start by going around the circle with names. About halfway around, I remembered the icebreaker and the philosophy sheets. When everyone had gone around, I looked at everyone and said that we were going to do an icebreaker. As I said it, I realized that I had no idea what icebreaker we were going to be doing. So I made one up. It was awful. No one really understood what was going on and just did what they thought was right. It was a complete failure, and by the end I was laughing awkwardly to myself (which I do way too much) and everyone else was completely puzzled and staring at me. I looked nervously at the philosophy and rambled for a while about how PLTL is a group process, I was not an answer key, and something about all of the group processes. More puzzled stares, but now the awkward laughs weren't coming from me. We went to the problem set. I explained the format, someone (probably me) read the problem and we were off into our super semester. Surprisingly, the awkwardness of the first day let my group know that not only am I not perfect, but I am a really strange and a little eccentric person. I think the jumbled, unprepared nature of the first day showed everyone the tone of the group that I had in mind, and showed the group that it was okay to mess up.

Being a PLTL leader is not about being perfect nor is it about making sure all of your students get A's in the class. In my view it is about building a community of learners where people feel free to ask questions, get them wrong and to learn from each

other. Being yourself, showing your humanity, and knowing your place as a leader are the only way that you as a leader can put your students on track to building a community that truly aids in their development as learners.

Role as a PLTL leader
by Stephen Tourjee

Being involved in PLTL has been an enriching experience for me. I can remember back to the first day when I was worried about making a positive first impression on my students. I often thought about what I would say to sound smart or knowledgeable. Sometimes, I even worried about whether I should sit or stand as I talked. More importantly, in communicating with the students, I didn't know if I was answering the students' questions sufficiently or in enough detail to answer their questions. Only after a few sessions did I realize the importance of leading the students in the right direction as opposed to being an answer key or source bank. And only after a few sessions did I realize the importance of keenly observing the group members, looking for signs of confusion or any group tension. Fulfilling one's role as a PLTL leader requires doing what best enables the group as a unit to learn and build interdependence. Playing this role means providing guided questions instead of solutions, ensuring everyone participates, and monitoring the group's progress through the entire session.

It is vital that the leader does not answer each student's question with detailed explanations that essentially give away the answer. As leaders, we must provide the students with an opportunity to problem-solve. On an exam, students are not provided with "tutors" or notes to consult, rather, they must think critically about what the problem is asking. Giving them answers is counterproductive to developing problem-solving skills. For example, students would often ask something like, "What does resonance-stabilized mean?" Or, "what is a cation?" "What if the particle were positively charged?" I find that these are good questions and it is good that the students are asking them. However, they should be questions that you as a leader are asking your students, not the

other way around. Even if they don't know right away, they can discuss among themselves, or you can at least return their question with a guided question such as, "Well do you know what an anion is?" or "How do the charge and force relate to one another?" You want to promote abstract thinking on their part to build confidence, otherwise they will ask you every time they have a question.

Playing the role of leader also means ensuring that everyone participates in the group and has reached a certain level of understanding. As leader, you have to be constantly vigilant. Students will almost always nod their heads when you ask them if they understand after a problem is solved, and some will remain quiet. They are only thinking about moving to the next problem. Instead of asking them if they understand, read their facial expressions, ask them the same question but in a different way, or assess how smoothly the problem was solved. If a student goes up to the board and seems completely lost, ask that particular student to recap the problem-solving process later. Students may be hesitant to indicate their misunderstanding out of fear of sounding "dumb," which is why you must be particularly on guard. As a leader, always seek out the quiet students and encourage them to participate and understand the material. Everyone must contribute for a successful group.

Finally, as leader, you should be aware of the group's progress at any given time. This means paying attention to the pace of the group and the stage the group is in (forming, storming, norming, etc.). Pace is important because the goal is to get through all the problems in each two hour session and to understand each thoroughly. Moving at the right pace is also practice for finishing a Gen Chem exam, as it is designed to take the average student only "1 hour" to complete. (©) Knowing the stage the group is in also

helps because it enables the leader to adjust accordingly. If your group is still in the forming stage, you know making the students comfortable with each other is important.

Fulfilling your role as a PLTL leader is not only good for the group members, it is good for you. By learning how to lead your students effectively, you learn for yourself how to improve as a student.

Structure of the Session by Fola Babatunde

Many factors can contribute to group dynamics and learning atmosphere. The following suggestions are tools the leader can use to improve upon the development of the group. One detail that is often overlooked is the environment of the room. The first thing the students see as they enter the room is the seating arrangement. If the tables are appropriately arranged as to force eye contact and face-to-face interactions, this can more easily stimulate discussions. After the students are seated, a smooth transition into the work for the week is to use an outline. The outline forces the students to recall the information they have been taught and provokes them to think about the continuity between concepts that lead to the bigger picture. One effective way of making the outline is to have one of the students act as the scribe while the rest of the students help fill in the information. As the students provide the information, the leader can ask probing questions to get the students to expand on the material. The ultimate goal of the outline is not to have the students read directly from their notes, but to have them elaborate on them.

Once the outline is completed, the students are ready to begin the problems. Many problems can arise during the problem-solving part. For example, there may be students working ahead and dominant students who are compelled to answer every question. In the case of students working ahead, the leader should cut the questions prior to the session. This forces all the students to work on the same problem at the same time. This may frustrate those who can quickly answer the problem, but it allows those who have questions a chance to be heard. Also, those who finish the problem quickly may gain new insight from the questions other students ask. Ultimately, it is not the answer

that is important, but the analysis of the various components of the problem. As for dominant students, the leader can try to incorporate all the students through different tactics in the problems. For each problem make sure the students write all their work on the board and then ask another student to explain the steps. This helps both the verbal and visual learners, and also forces the participation of everyone. The leader should continue to interject with questions that can expand on topics as the steps are explained by the students. However, most importantly, the leader's role is to be a facilitator and not a tutor. This is an important distinction to make; there is a fine balance between the two. If a student does not understand a problem, the leader should ask other students who understand the concept to explain it to others. In the case when everyone is confused, the leader can ask leading questions that help the students through some of the pathway, but does not give them the answer or show them how to do the problem.

The skill of the leader comes from his/her ability to redesign the problems to strengthen group dynamics and deepen understanding. Each problem type requires a different strategy. For example in small groups, as the problems are being worked the leader should walk around. At times the students rely on other groups rather than working among their assigned group. The leader can lessen these effects by asking for input from each group individually. This forces the group members to ignore the other groups and be interactive with the leader. Also, the leader can make sure the groups are not completely lost. Other advice for another problem type is that during round robin the leader should go out of order. This produces spontaneity and active engagement of all the students.

The group should be able to go through each problem thoroughly by the questions posed by the leader and other students. Although the students may want to rush through

the problems it is important not to get into the habit of ending the sessions too early. All questions should be addressed before the end and an appropriate pace should be utilized.

As emphasized, organization is helpful, but this does not mean a rigid structure is necessary. Flexibility allows for unique contributions from the students and further insight not foreseen. However, organization provides a basic framework for the session.

Structure and Design – Making a Sturdier PLTL Session by Joseph Brown

Now that you have been chosen to lead in PLTL you are required to read this packet about how to be a better leader and just as everyone else has done and will do, I will give you my two cents about leading a PLTL session. But, I will be focusing only on the structure of the session. One simple thing to do that is fairly easy and will keep your group fresh every week is to change the room around. This can be accomplished in a few easy ways: by both changing the orientation of the tables in the room, and by constantly changing where you sit so that other people don't end up sitting in the same seat every week and don't spend time with others in their group. Another thing that is easy to do and will help your group get much tighter (plus have more fun together) is take time to goof off. Don't do this for a significant portion of time during the session, but it does help to let the group talk about their weekends, or vent about their E-Comp. teacher, because then they get to know each other better and it will make them look forward to the session even more if they enjoy each other's company.

My biggest piece of advice to new leaders, however, is to take the time before going through the problems to write up all the pertinent information from the week on the board. This accomplishes a number of significant purposes. First of all, even if everyone understands the material it gets them thinking about Chemistry again after a long weekend. Next, it helps to get everyone on the same playing field. If someone was working through the problem set or listening to lecture and they didn't understand a certain topic, this gives them the time to ask about it. An explanation from a peer may also be the best way for them to understand it, because often a student finds their own way to understand the material and that may be better understood by their peer. Third, by

talking about the equations, constants, and other information from the week it helps the group review the material and it is good for them to see the material as often as possible because it will help them retain the material better. Finally, it is especially important to note that you should write the information on a sectioned off part of the main board and then you should leave it up there for the entire session. This serves to accomplish the final reason to take the time to do this: it gives them a resource during the session to reference if they are struggling when solving a problem. It also gives you something to refer to if they are not getting anywhere because then you don't have to explain the answer, you can tell them to look at a specific equation that should get them down the right path to the solutions. Lastly, I would like to say that I also found it effective to tell one person to take notes during the week in terms of what equations should be put on the board the next week. Furthermore, by making each student responsible for this during one week, that one person ends up reviewing a bit more that week and that's good for them and their study of the material.

Structuring Your Session

by Annie Ko

The first thing to remember about PLTL is that *you* are the “leader,” *you* are their facilitator, and everything is in *your* hands. ☺ You’ll hear the word group dynamics thrown around a lot, but essentially, *you* are in charge of the group dynamics through the way you lead, the first ice breaker that is done, and most of all, the way you structure your session. You’ll find that there is a lot of room for creativity in PLTL – the program only stipulates the approach you should take for each problem (round robin, small groups, scribe, two-column method, etc.). But the rest is all up to you! I still remember my first few sessions where I was completely flustered and struggling to be the “best leader” for my group. The way I structured the group sessions was influenced in large part to the needs of my students and the way they responded to different methods.

In your first SAM session, you’ll get tips on how to facilitate your first PLTL – try them out! I definitely found that making an agenda at the beginning and writing down some key concepts on the board being extremely helpful in the first few sessions. It helps you establish your authority and gives the two hours a framework to work off on. However, as the weeks progress, adapt to your group and see what is most useful for them. Many leaders have found that instead of writing the key concepts (definitions, equations, etc.) on the board *for* the students, it is more effective to have a rough outline and call on students to fill in the details. Other leaders don’t start with a re-cap of the past week’s lessons, but do it based on need; if the group doesn’t have a clue on a problem, then it is obvious that they need a refresher and need to go through their notes once more. Whatever the case, every group is unique, and a strategy that works for your friend’s group may not work for yours. Be daring and try different things out! ☺

Although you'll be told how to lead each problem in your PAM sessions, the way you implement them is still in your hands. One thing I recommend is to call on your students for round robin in a random order to keep them on their feet. A fellow leader of mine had a great way of doing round robin: instead of her calling on the next student, she would call on the first one, and after they finished the problem, it was that student's responsibility to call on the next student. I thought this was ingenious! Not only is the order random, but it also encourages the group members to get to know each other better (especially during the first few weeks when remembering names is still difficult). You may also find that a combination of round robin and scribe is helpful for more difficult problems – just don't let the students forget that you are merely scribing and *they* are still thinking through the problem.

All of this is still just words on paper – you won't fully understand until you've done your first session. You'll have so many tidbits of advice thrown at you, and I urge you to try them out and see how it bodes with your students. If you take away anything, just remember that *you* are in charge and part of the group's dynamics will be shaped through your actions. Daunting, isn't it? But, you will all do well. ☺ You have all been through PLTL once and each of you brings a different flavor to the program based on your own experiences. Try things that you remember worked for your group and things that didn't – your cluster of students may like it!

Setting the Mood by Taryn Quattrocchi

The structure of your session can have a great impact on how successful it is. Though it may not always seem like it, there is more to a session than simply going through the problem set. Structure can affect your group's confidence. Structure can make or break a group's effectiveness. Structure can also determine whether you cover all of the week's material within the two-hour limit. There is no one specific way to run your session; each leader has to do what seems to work best for their group. Here are some suggestions to think about.

Layout of the room. Pay attention to the table itself. Is it just one table, or many smaller tables? If it is one table, is it so big that group members at either end cannot communicate well? If so, you may want to consolidate your group on one end of the table, instead of letting them spread out; then when you have small groups, you can utilize both ends. If the group is too spread out, it can leave some members feeling left out. If you have many smaller tables, perhaps like the small rectangular ones found in Danforth, put them together to form a larger table. Don't put them in rows or in a half circle (like risers on stage), or anything that will spread the group out across the room. Try to form a tight area in which to work, still giving people room to write and spread their books and notes out.

Make sure everyone can see the board (either dry-erase or chalk). Seeing other student's work is crucial to understanding, especially for pictures. Check to see if there is a glare, and if so, try to adjust the blinds, move the table and chairs off to one side, dim one of the lights, etc. Try to have each chair at a 90 degree angle to the board. If everyone is facing the board, it is harder for the group to see each other, particularly

during activities with more than two people in each group, such as small groups or group chaos. If everyone is facing the board, it becomes more like a classroom, and the emphasis of PLTL should be on working with the group. At a 90 degree angle, they can easily see the board, while still facing members of the group. Chances are, your group will sit wherever you set the chairs, so basically, make sure your chairs are in an open oval or circle, and not in a straight line. You the leader need to sit at the end of the table or stand up and walk around the whole time. You want to be part of the group, but distinguishable from the other members.

If you bring food, which I recommend if you have a morning session (11:00 am or earlier), either place it in the middle of the group, or on a table in the back, depending how much space you need. It can be sometimes be distracting if it is in the middle of the table where people are trying to work and it takes up too much space. However, placing the food at a table at the back will force members to have to get up to get it, which may be distracting as well, especially if someone is at the board.

The Problem Set. When you go through the problems each week before your session, mark which ones take a lot of time, and which ones are shorter or easier. Know which ones explain the new material, and which ones review old material. If your sessions have been running more than two hours, you may wish to cut a review problem or two out, especially if your group seems to understand the concept well. After a difficult or lengthy problem, you may wish to skip ahead to a shorter, review problem to boost the morale and confidence of the group. If you start your session with round robin, be prepared that one or more of the members of your group may be lost—starting with partners or small groups will allow them the chance to ask other students' questions.

To be time-effective, either in making sure your group finishes in the two hours or making sure your group doesn't get bored or off-track, have members concurrently work on round-robin problems. If the problem requires no computation, then working one-at-a-time goes fairly quickly. However, as is often common in Calculus groups, if the problems involve working out the problem either on the board or at their seats, the group is often forced to wait for each student to arrive to a conclusion. Each member still needs to explain their problem individually, but having two members work their respective problems out at the same time not only saves time, but keeps more of the group involved. If at any point the member gets stuck or looks lost, ask them if they would like to ask the group for help, which can be verbal help, or by written help at the board. This is particularly effective in emphasizing the group aspect of PLTL and keeping the session running smoothly.

Before and After. You may wish to summarize the concepts of that week's lecture prior to beginning the problem set, in order to give everyone a chance to refresh their memories and clarify the parts of the material about which they had questions. This also gives you the leader a chance to check which material the professor may not have covered yet, as sometimes happens. If it is the session before an exam, or the professor hasn't yet covered the majority of the material on the problem set, you may have to explain some of it to them. Don't immediately start teaching—ask the members to share how they think they would approach the problem, and have them look it up in their textbooks. Ask lots of questions, and try to help them figure it out themselves. Give a disclaimer though, that you are not the professor, and instruct them to try to attend office hours or help sessions. If you find yourself in this situation, you might think about abandoning the new problem set and just using this session as review of the previous

material, having the group field each other's questions. Another way to summarize the material is to keep a running equation list, off to the side of the board. Here you or members of your group should write new formulas and definitions. This gives members a concise list for their notes, and a convenient place to reference the new material during the session.

These are simply the suggestions I can offer from my own experience with my own groups. The most important thing to remember is that it is perfectly acceptable to break rules or norms in terms of methods, as long as you are keeping with the PLTL philosophy—use whatever works as long as the group is working together to learn.

Tips for the First Day by Bethany Curd

So you are wondering what your first session of PLTL will be like? You have attended your first few SAM classes and went over a little bit of the process, but they were more of an introduction to the class than an introduction to PLTL. You have gone to your first PAM session and seen all the returning upper classmen who have committed general chemistry to their long-term memory and describe PLTL as a lot of fun. At first the initial thoughts going through your head are of the ideal PLTL group, the one where the students all get along with each other as well as with you. It is the group that is prepared and has gone to lecture and recitation as well as completing all the homework problems prior to the session; they finish the problem set smoothly and get out early, but not because you are rushing them. You can almost feel the satisfaction of helping these students understand chemistry as well as you did when you were in their shoes. However, this image is crushed by the opposite image of a group you can not hold together no matter how much you try. You have that image of the first meeting where they are silent and not willing to participate no matter how much you question for the answers. They disagree on answers and ridicule each other creating an atmosphere not conducive to group work at all. You just hold this image in your mind and hope that it does not turn out to be your group.

So you want some advice, how can I make my group into the first image and keep them from becoming the second? Well it all begins with a good ice breaker. I found particular success in playing two truths and a lie, even when it was played the second session. During my first session I had everyone say their name, where they were from, as well as where they lived on campus. This helped to break some of the awkwardness

between students because they lived in similar buildings or residential colleges; I was also just curious to know if anyone lived in my old building. Two truths and a lie was helpful because it allowed them to find out different information about each other they most likely would not have known throughout the PLTL session. Once you are able to make the members of the group comfortable with each other, they will not feel as though they always have to be correct when answering questions. Establishing a comfortable environment from the beginning will help them work more effectively as a team for the entire semester.

In addition to a good ice breaker it also helps to begin calling the students by their names, and the sooner you do this the better. If you take the time to use their names they will know that PLTL is important to you, that they are important to you, and they will also get to know each other that much quicker. It helped me to pass around a piece of paper in which they all wrote down their names. I then secretly kept this with me throughout the first two sessions. When I was unsure of an individuals name I could then refer to the paper and from the order they were sitting in I knew which student matched the name, at least for the first session. This helps to bring the group closer and helped to create that positive atmosphere.

All in all just remember that PLTL is something that is fun. Do not stress out too much over how smoothly your PLTL session will run, things will fall into place. Just remember that you are there to guide your group, not to be a chemistry guru. Remember that you are not expected to teach them concepts and that it is acceptable to say you do not know the answer and that they should ask a professor or teaching assistant. They are suppose to be doing their work for the class outside of PLTL and it is acceptable for you

to send them an initial e-mail telling them they should be prepared for the session. You will do fine and Good Luck at your first session!

Tips for the First Day by Christine Donahue

Set the tone: With eight blank faces staring at you in the first session of PLTL, you may feel intimidated as a facilitator. Don't be! It is important to come into the first session with the appropriate attitude in order to set the tone for the entire semester. If you are friendly, confident, and enthusiastic, the situation will be less intimidating for you and for the students. Another part of initially setting the tone for the group includes stressing several important things that improve the group's ability to function as one unit, such as the importance of arriving on time and doing the homework before coming to PLTL. By emphasizing, on the first day, these important contributors to successful group work, the group members will immediately understand what is expected of them. Just remember to be positive and confident toward your group, and your session should run very smoothly.

Arrive prepared: Being prepared for the first session of PLTL requires a number of considerations. Before the first session you should email your group including an introduction of yourself, a reminder to try their homework problems before arriving at the first meeting, and a suggestion of the supplies they will need to bring to PLTL (calculator, pencil, notes, periodic table, etc). By encouraging everyone to come prepared, your group will likely function more smoothly as a whole. Also, bringing a treat, such as candy or cookies, was very much appreciated by the students. Once you arrive to your first session, it is useful to write an outline of topics for that day's session on the chalkboard. These topics could include: introduction to PLTL, icebreaker activity, review of concepts, and solve problem set. Creating an outline can help you stay focused and organized throughout the session, as well as informing the group members

how the session will run. This technique also helps ease any nervousness you may have going into your first session.

Break the ice: As the students arrive, they will likely be silent toward you and other group members, since they probably are not familiar with you as the leader, the other students, or even the group work setting. Chatting about topics other than chemistry, calculus, or physics before the start of the session is an easy way to break the ice. To start off the first week, I had the students create a name card to put in front of them during the session, allowing the students to become familiar with each other's names over the course of the session. If you, as the facilitator, call the students by name during the session, this will encourage the other group members to do so, too.

Also, an icebreaker game really does prove effective in building group familiarity and cohesiveness, even if many group members roll their eyes upon mention of yet *another* icebreaker game at the beginning of the school year. The activity can be as simple as sharing a "fun fact" or something they did over the summer, but it will have important consequences. This initial interaction allows the group members to learn names, talk with one another, and find common interests before they start solving the problems. This is the first step in creating cohesion within the group. For my first week as a PLTL leader, as part of the ice breaker, I asked each student to tell the group his or her favorite candy or snack. As everyone shared their candy or snack preference to the group, I jotted down notes about who liked what. Then, throughout the course of the semester, I tried to bring everyone's favorite treat to share with the group, which everyone enjoyed immensely!

Tips for the First Day by Steve Imm

From my experiences, one of chief things to keep in mind is the balance that is often required of a PLTL leader. That is, if you're nervous, you're human. But being human also entails one to try to move beyond one's own apprehensions and communicate your position as an organizer, and motivator of the group. Thus, take a deep breath, remember some of the topics, and if all else fails, bring candy to ease the transition from simply being a good student in Chemistry/Calculus/Physics to being a good leader.

The first day is challenging because one's expectations of how the group will turn out can be proved wrong by the dynamics that begin to show up as the semester progresses. In many cases, one's first experiences can lead to complacency. So, with that in mind, enter the first day prepared, but without any regard to stereotypes or predisposed judgments that you might hold for the group. For instance, I expected that every weekend that my PLTL group would gather together, there would be full attendance, and very active participation. And for the first day I was correct. Yet, as the semester wore on and attendance declined, I found that my expectations resulting from that first day were skewed. As a result, if you come into your initial meeting with tons of energy and excitement, be prepared to do the same for the rest of the semester – there's no guarantee that your students will follow suit.

On that note, establishing an initial atmosphere of trust and comfort between the other members and yourself is also a key aspect of being a PLTL leader. One of things that could help is putting yourself in their situation (an easy feat considering all of us went through the same thing at one point last year). In doing so, this may allow you to gain a little perspective on just how new their situation might be, which may allow you to

understand the initial dynamics on a better level. Icebreakers work well as a starter, as do brief biographies of each individual in the group. In doing so, making a sincere effort to create a comfortable environment among members is a chief tool that will allow the first day and, hopefully, successive sessions, run smoothly.

While comfort level and expectations are important factors to be aware of, management of group dynamics is a subtle, but important, aspect that will probably show up as you begin the first problem set. Group dynamics involves a myriad of items: communication skills and styles, positioning, intonations and innuendos, as well as overall subject skill in regards to Calculus, Chemistry, or Physics. Be on the lookout for individuals who might be a little shy; try to get them involved. View how people communicate with each other – people who have more direct, upfront styles of speech might be intimidating to others. Each member is a different person which, fortunately, is a great thing for PLTL. Because of these diverse capabilities and styles, one tip for the first day is to simply be prepared to take note of these differences. As the weeks progress forward, references to those styles will allow you to adjust your management of the group to achieve better success.

Finally, it's important to remember to take that deep breath, have some fun, and be yourself. While PLTL is centered around implementing positive group dynamics and support, the way you do so is up to you. PLTL is a semester-long challenge that one faces in committing to leadership, and maintaining consistency, enthusiasm, and awareness is likewise. Yet, by also creating a level of comfort and confidence for oneself on that first day, the odds are that you won't only make it through the semester – you'll also have some fun and foster a greater sense of community as a result of that foundation.

Tips for the First Day

by Ann Ng

In the minutes before my Chemistry PLTL group walked in for the first day, I remember sitting down and looking at everything on the table. A box of markers lay open, so the group could make name tags. Chocolates were sprawled all in the center. My name was on the chalkboard, as was the agenda, and eight chairs were neatly arranged around the table. When I first came into the room that day 30 minutes early, I was nervous. I wanted the group to have a good impression of me and of themselves because my worst fear was that they would leave that day without any idea of how PLTL would help them. I didn't want them to dread coming every week, and the best way to avoid that is to build a light and positive atmosphere. The formation of this environment starts the first day.

What helped me through my nervousness of the first day was to have everything prepared ahead of time. There was so much to hand out and talk about the first day, that writing an agenda on the board made everything I had to do concrete. It provided some structure on the first day for the students coming in, who were stressed about PLTL. Realistically, most of the students do not know what to expect on the first day because all that they had heard before was that in order to do well in General Chemistry, they had to participate in this. Most come in expecting to dread it, so it is vital that the leader sets the ground rules for the sessions and explains the PLTL philosophy. For me, introducing myself as a student who was not far removed from the position the group members were sitting in, provided a more relaxed framework. It is important on that first day to show the group who you are by being yourself. Let them know that you are a peer and will be there

to guide them; your goal was the same as theirs: you wanted them to all do well in General Chemistry.

While small, one of the most important things that must be accomplished the first day is to let the group become acquainted. Do an icebreaker. Devise a way for everyone to remember each others' names. As the leader, study the roster beforehand, and call everyone by their names on the first day. A positive atmosphere can only be created when the group members are comfortable with the group; I found that once my group had introduced themselves and had a chance to say something to the group, the connections were being made instantaneously. So it's just as important that you should give the members the time to be themselves as it is that you be yourself. The questions start with asking about their hometowns and their high schools, but later in the session and in future ones, it will be easier for them to ask someone they know a question about some difficult concept.

Despite all this preparation that you could do for your first session, I think the most important tip is to try and have fun. A smile or a joke the first day to invoke laughter can go a long way. In addition, the first session is not always an accurate indication of what the group will be like for the rest of the semester. As the familiarity and comfort builds, you will be surprised at how much of a team your group will become.

How I Survived my First PLTL: Based on Actual Events by Yael Shuchatowitz

First impressions can be lasting. The first session of PLTL is your first chance to impress on your group your role as a leader, their role as group members, the PLTL method, as well as your own personal leading style. This is of course as immense responsibility that can only add stress and worry to your already crazy life. Being slightly anxious to meet your new group members is only natural, and not necessarily a bad thing. You will be over prepared, eager to create a group dynamic and excited to watch your group bond over weekly problem sets.

The first thing that you as a leader must do is break the ice. This is the crucial opportunity to get to know your group members, try to learn as many names as possible so you can later find them on facebook, and show your silly fun side. Food is always welcome to be incorporated into, or to supplement, an ice breaking activity. Keep in mind, though, that for many, freshman orientation and pre-orientation programs are week-long ice-breaking activities, so they may not be as eager to open up as you had hoped. It can be challenging to come up with ice breakers that are both fun and not overused, but the more original and exciting the better. If your ice breaker is not as top notch as you'd like, make sure that the food you bring balances that out.

After meeting everyone and learning two truths and a lie about their lives, it's time to introduce the PLTL philosophy. This is key is getting your group to help you help them. Once they understand your role is to lead, not to teach, they may begin to rely on each other. Of course this will only happen a few weeks into the semester, but you need to introduce it now. PLTL is a different approach to learning, one that many students are

not familiar with. Letting your group understand how the sessions will function is always a good way to start off on the right foot.

Now that all of them are friends and understand your mission, it is time to get down to work. You will of course be over prepared for the first session; you know how to do each problem correctly and understand the concepts behind it. You're ready for your group to look at you for the answers so you can tell them "Sorry, I'm not the answer key." They, on the other hand, may not be as prepared as you. They will look at you expectantly, waiting for you to begin the round robin, or set them up in pairs. Once you get them started, things will begin to flow smoothly, until the inevitable problem. For some groups, this is the silence that occurs during pairs problems; for other groups, it is the dominant student who "helps" all the other members on their round-robin questions. No matter how prepared you are, there is bound to be something that you did not anticipate coming to ruin your perfect first experience.

Not having a perfect first session is not a disaster; in fact it can be a blessing. Now that you have met your group and tried to lead a group through the problem sets, you have a more realistic view on how PLTL will go. You should not judge the rest of the semester by your first session. Everyone is still adjusting to life at college and especially to the new fangled PLTL method. Working together through the semester will bring your group together, so you don't need to worry after the first session if your members are still unrealistically polite and eager to learn. Your members will stop coming on time; they will be tired and lazy; they will become friends and spend more time talking than doing problems. Some may stop coming altogether, while others may show up every week, much to your dismay. These are problems to look forward to later on in the semester. For

the first day you need to focus on getting complete strangers to come together for two hours to learn through the PLTL method.

Once the first day is over, you can breathe a sigh of relief as you collect left over worksheets, throw out the candy wrappers, and go off to write your first reflection. Congratulations! You have just experienced PLTL first hand and survived. You're now ready to face the challenges that lie ahead.

Leading Positions by Lonia Friedlander

PLTL is like a box of chocolates; you never know what you're going to get. Your group of students may be bland but brilliant, or it might be a constant mix of flavors. To further confuse the issue, groups often change throughout the semester, and some groups change on a weekly basis. That said, there are certain general leadership positions a good leader can maintain to keep dynamics in the group open, healthy and relatively consistent. These positions are; awareness of learning styles, laying and enforcing ground rules and remaining a part of the group. Each of these can be summed up in the basic concept of maintaining a balance between your students.

Some students are visual learners, others are verbal and a minority are active (hands-on). Within any given worksheet there should be at least one question for each of the learning types, but be aware that any problem can be shown using multiple styles. It is important that you attempt to have a different student put each problem on the board and then have the group discuss it. Try and make sure no one student is dominating any particular part of the process. Switching roles with each problem will force students to use many different learning styles. Failing to change roles will cause the group to stagnate as each student does only what he or she feels most comfortable doing. Watch your students over the course of the semester to determine their learning styles. This way you can allow them to use their strengths while encouraging them to develop their weaknesses. Never listen to an affirmative answer to the question, "Are you okay with that problem?" especially if that student's dominant learning style has been neglected, force the student to explain the problem using their learning style.

The laying and enforcing of ground rules is much more important than it may at first seem to be. In the beginning of your sessions things will be quiet, everyone will be on their best behavior, people will be nervous and respectful. This will change. The biggest difference between a group at the beginning of the semester and a group at the end of the semester is the amount of silence. Getting your rules on group behavior out while people are quiet enough to hear them, will be something you will thank yourself for later. Ground rules will also keep the group on an even keel when things differ on a weekly basis. If there are rules about how many people can be speaking at once, then on loud weeks everyone will still be heard; if you make a rule on discussing problems before moving on, then on quiet weeks everyone will still have to participate. Rules can also keep teasing to a minimum because this can become a problem as your students become comfortable with one another.

Finally, try and see yourself as a part of the group. I'm sure that this will conflict with other, previously given advice, but I think that it's a great way to make yourself aware of group dynamics. If you see yourself as part of the group it means that you are acutely aware of how things are working. With you as leader and group member, open relationships among your students will also be encouraged because you will be much less intimidating. Boundaries within the group will break down more quickly.

Last thoughts...Stress the importance of attendance. You may not realize how much attendance changes the group approach to learning until it has already started affecting dynamics. Don't be afraid of silence, especially if girls dominate your group. Girls tend to think before they start participating, guys think while they start talking. Neither approach is better or worse, it is just something that is important to be aware. Reign in dominant students quickly or weaker students will never learn to participate.

Remember (especially on that nerve-racking first day) that your students are probably as afraid of you as you are of them. Don't worry about whether or not they'll like you. They need a leader, not a friend. A good person will end up being both, but focus on being a leader first. Trust your instincts.

The Balance
by Michelle Jamison

“So I sit there and watch the students do the problem set, are you sure you have to have an A in the class before being a PLTL leader for that subject?” These were my thoughts coming into the program. The PLTL philosophy is greatly concerned with allowing the students to work together to answer the problem. PLTL leaders are encouraged to let the students work the problems without our help and if the students are stuck we should *guide* students towards answers. This seems straightforward and not too difficult but when your students are given a problem and they all look at you with blank confused faces you are presented with the issue. How do you *guide* them to the answer without giving the answer away or without telling them how to solve the problem? This is the balance that all PLTL leaders have to possess; the balance that took me almost all of this first semester to achieve.

The first side of the balance is the proctoring side. As a PLTL leader we are to guide our students through problems and facilitate their discussion on the topics the problem deals with. An important key here is that it is ok to guide your students in the wrong direction initially. Sometimes your students will feel like they know how to solve the problem by using a faulty method. Let them try their method and guide them through the problem using their method. Eventually they will get to a point where their method doesn't make sense and they will learn the error in their ways. This helps students because when they make an error in practice they are less likely to make that same error on a test or homework. It's also important to have patience. As you guide your students through a problem, they may be stuck and not know how to continue with the problem or how to connect ideas in order to solve the problem. Before you attempt to give them any

hints or more information you should be patient and see if they can connect the ideas on their own. Also, when we guide our students through problems we try to give away the least amount of information as possible. Ask questions like “What is this problem asking us for?” and “What formulas or methods can we use to answer this problem?” Letting the students answer problems on their own helps them gain confidence in their problem-solving abilities which is why it is important that we as PLTL leaders do not try to solve the problem for them.

The second part of the balance is the tutoring side. As PLTL leaders we are not supposed to be tutoring students, but if you ask any former PLTL leader they will tell you that a successful PLTL leader has to be able to do some tutoring. Sometimes all of the questions and prompts you use to guide your students to an answer lead nowhere; the students still do not know how to solve the problem. In this situation, you are going to have to do some tutoring. Instead of teaching the students how to solve the problem, you should discuss the underlying topic. You could start off by asking the students what they know about the topic and then fill in the gaps with more information about the topic or how to apply the topic. After discussing the topic in detail go back to the problem and see if the students now have a better grasp on how to approach the problem. In teaching the student about the topic and not about how to solve the problem the students still get to apply their problem-solving skills.

PLTL can be a rewarding experience, particularly rewarding when you know your students can leave your session feeling like they have learned something and strengthened their problem-solving skills. The best way to achieve this is to keep in mind that in being a PLTL leader you are not a tutor nor a facilitator, but rather a balance between the two.

Draw Me a Map
by Lauren Krebs

It was one o'clock in the morning when our light blue minivan (with the wood panel down the side, of course) putted to a stop outside the Texaco station. My brother and I curled up in the back seat, fearfully anticipating the angered rage guaranteed to spew from the lips of our quick-tempered father in t-minus-three seconds. He stormed out of the car, dragged us from our seats, and had us follow him into the gas station's food mart to ask the clerk for directions.

"It's quite easy, mister," was the teenager's reply. "You just go down eight blocks, turn left at the Sears, right after the yellow fire hydrant, continue through two stoplights, pass the high school, and it's right there: caddy corner from the clock shop. You can't miss it." My dad's face had grown noticeably red and showed extreme exasperation. He grabbed the guy by the forearm, put his eyes about two inches from the kid's face, and firmly growled, "Draw me a map."

As a PLTL leader, an important secret to success is the ability to discern when to discuss a concept by saying that it's down two stoplights and across from the clock shop, and when to go ahead and draw the map. We all learn through different means. While some students are verbal learners and are very receptive to written or spoken explanations of a topic, other students will only be able to let these descriptions go in one ear and out the other. Some students are visual learners and need to physically see the mechanisms behind a verbal explanation – they need a model, a drawing, or a concept map. Some students think globally and are able to comprehend the big picture behind a problem, seeing in their minds the ultimate goal and then struggling to piece together the detailed route to getting there. Meanwhile, other students are sequential thinkers who can only

work in a step-by-step manner, solving one part of the problem at a time, hoping that their connected steps will crash into the answer for which they are looking.

One of the best ways to create a successful PLTL session is to ensure that the explanations provided by you and your group members are given in a manner that agrees with the preferred learning styles of your group members. An obvious first step to this end is recognizing what these learning styles actually are. In your first few sessions, ask your group members to explain concepts or steps to each other in multiple different ways (i.e., ask them to verbally explain something *and then also* draw a picture). Your group members may be reluctant to explore alternate explanations at first, and you may need to model educational flexibility by being prepared with your own. In this process, pay careful attention to which explanations make everything “click” for certain students. The moment of comprehension is very visible in most students – eyes light up, heads nod excessively, hands start writing hastily. When you see these responses, make mental notes of what works for your students and then actively pursue these routes to understanding in future sessions.

Paying attention to the learning styles that define your PLTL group members has two major benefits. First, your group members will more efficiently understand concepts when they are presented in the manner that speaks most directly to them. This will help your sessions run smoothly and minimize the amount of time that your students spend in a state of confusion. Second, all of your group members are likely to have different learning styles, so catering to each of them will diversify the learning of your other group members, allowing them to look at problems from multiple angles and deepening your group members’ understanding of the material.

A great PLTL leader is one who can recognize the individual capabilities of each member and then cater to them. Your group is not one unit to be viewed as one collective whole, but rather as an assembly of individuals, each with his or her own quirks and academic abilities. The best PLTL leaders serve the individuals in their groups by knowing how they learn and then ensuring that they are taught in this manner. Just know when it is time to draw a map.

Academic Approaches by Stephanie Leu

You might think that you are the most nervous person at the first PLTL session, but I'm sure the students are equally anxious. As the student, I remember wondering what PLTL would comprise of and require me to do. I was surprised by and didn't enjoy all of the problem solving methods we used. Going up to write on the board is always a lot of fun, but I wasn't always one hundred percent positive whether or not what I wrote was correct. Of course being put on the spot during Round Robin brought instant pressure to not take too long and also come up with the right answer. However, your job as a leader should be to relieve as much of that stress as possible by catering to different learning styles. As you may know, some people are visual learners, while others are verbal. Some are more formulaic thinking, while others like to have short answers.

You must remember that your group consists of a variety of learning styles. Not everyone will learn how you like to learn, and you have to deliberately reach out to encompass others also. Writing everything on the board is key, whether or not you are a visual learner. It allows the visual learners to see the thought process while allowing the writer to reinforce and double check his or her work. I also recommend reading the question aloud before beginning. Not only does this bring together the attention of the whole group, the audial people can hear and understand the question.

Some people are also fast paced, while others are slower paced. This doesn't mean that you should let those who work faster work ahead, while the slower ones fall behind. Instead this provides an opportunity to exchange thought processes and interactions between students. Perhaps some of the faster people jump to the right answer, but don't know how they got there. Pairing a slow and fast worker together

forces the fast person to slow down and explain step by step how they got to the final answer, while the slower person can understand and contribute to the process.

You should also keep in mind when pairing and putting together small groups that you should mix things up sometimes. If the same two people pair together every single time, it might be because they work well together, however it doesn't allow them to explore other ways of learning. Even though it might make you feel weird to force people together who don't know each other, you should do this.

If you are having problems with your group working ahead, or even if you don't have any problems, a different tactic you can use is the one pencil method. In this method you assign people roles: scribe, explainer, and presenter. The scribe writes down the work, the explainer tells the scribe what to do, and the presenter must know what is going on also because they must present to the rest of the group.

As a new leader, you should keep these things in mind, though they are not concrete. You should begin to get a feel for your group and how they work together, what are their strength and weaknesses. You can adjust ways of solving the problems to play towards that.

Dynamo Dynamics!
Laura Cohen

One of the most exciting aspects of having a PLTL group was being able to observe changes in group dynamics. I was shocked at how easily my group changed its character from simple environmental changes. However, instead of letting the group change its dynamics on their own, I learned how I could be the cause of the shift in dynamics.

One of the most prominent environmental factors that can affect your group's dynamics is the room in which you hold your weekly session. Some rooms are very large and open, and others are smaller and cramped. Regardless, it is important to optimize your space – your group will change accordingly! I learned the hard way that it is important that your students don't sit in the same place every week. When my sessions started, I took a place at the head of our table and for the first few weeks sat in the same spot. My group members saw that I was sitting in the same seat and did the same things themselves. Because of this, they didn't mingle as much in the first few weeks. The self-segregation continued until I realized that they were not forming as a group because of this. The easiest thing to do was change my spot. I sat in the middle of the table rather than at the end and noticed a significant change. The students who used to place themselves at the opposite end of the table had to disperse because their usual spots were not available. I remember that specific session running very smoothly with a lot of group discussion. The next week I decided to turn the table in the room so that the maximum number of people could see the white-board and was shocked at how well the group communicated because of this.

Changing the group dynamics keeps your group members on their toes. Although creating a routine may feel comfortable, things can get boring and your group could hit a rut when you don't change things around. One of the easiest things you can do is physically make them move. For the partner problems, assign each member to someone who you have never seen them talk to before and make them move across the room. By changing partners you can make each member more comfortable with each other. Eventually your hard work will pay off and your PLTL group will reach its ultimate performing stage.

Group Dynamics 101 by Rex Hung

In order to properly facilitate a pleasant and enjoyable team-learning session a leader needs first to identify what makes his group tick – that is, the group dynamic. The group dynamic is several aspects of behavior that give a crew of students a sort of singular personality when they sit together in a room and solve problems cooperatively, or, at least attempt to do so. After a few sessions, any leader will most likely pick up on his group's character, but, why wait a few weeks when you can learn a bit of what to look for now?

Naturally, the most easily detectable aspect of the group dynamic is the sum of individual personalities of your members. Like or not, most people do not change much in a room full of peers, regardless of whether or not there is a set of chemistry problems in front of them. Of course, this can be both helpful and difficult – a chatty and lively group is easily coaxed into discussion and teamwork, though their attention will tend to veer off toward dinner, or such.

A rather more difficult part of the dynamic is each member's learning style. This is loosely analogous to a "learning personality;" the significance is that an explanation that works for seven students may be leaving one coughing in the dust. Arguably the most basic caveat in managing learning styles is that you must quickly distinguish between visual and verbal learners and accommodate both accordingly: the reason why we use rooms with whiteboards is not to write a bunch of numbers on them. Numbers and pictures together is the goal. Learning styles at times may also appear to overlap with individual personality, with intuitive learners bounding forward while the sequential, methodical students carefully work through their problems in stepwise fashion. Choosing

those intuitive learners who tend only to land briefly on the steps of a complicated problem to explain their process can be useful in helping them better grasp the proper methods, for instance.

Combining the previous two “personalities” brings us to a third element of the group dynamic, interpersonal relationships. Some students, as we know, simply get along with each other, and some do not. Unfortunately, students do not even need to talk to each other to develop harmful relationships – the week after exam day, for example, may be a terse mixture of curve setters and, for lack of better term, students who are unhappy with their grades. Guiding conversation away from how each student did helps ameliorate any undue tension, and asking “What did you *learn* from this exam,” cheesy as it is, can produce surprisingly positive responses. Keeping these relationships in mind is important in pairing students for small-group work; while putting the strongest student with the weakest often seems like a good plan, it is crucial to weigh forces of personality as well so as to avoid having one student dominate the conversation.

The sum of students’ interactions within the group is the tempo of the group. Once the leader and the students are familiar with and accustomed to the general styles and abilities of each individual, the entire crew will naturally adopt a routine pace. This may mean that the session progresses from problem to problem with strictly-business related explanation transposed, or it can turn out to be a more lighthearted, relaxed speed. The crucial point here is that the tempo of the group must be controlled. Often, the loudest and most competent students dictate a pace that is too rapid for a minority to follow, and either impatience or “cheating” in the form of working ahead will result. This problem also appears when, say, the only visual learner in the group is absent – the rest of the students may work more rapidly without his presence, but when he returns the

leader must accommodate him and restrain the tempo if necessary. It is of critical importance to keep a tight reign on the tempo, because if it spirals out of control the cohesion of the group is quickly lost.

The nuances of the group dynamic are, of course, best learned first-hand, and they are in number far more variegated than can be covered here. In any case, best of luck with your first session, and remember that there is only so much you can do – most of your job is to let the students do theirs.

Group Dynamics

by Brian Robertson

The group dynamic is not only one of the most important aspects of your group, it is also the most difficult to understand. Even then it is not easy to modify or affect change in group dynamics. Each member of your group has their own personality that differs not only in their understanding, learning style and the way they relate to other people, but also in their potential for contributing to the group. On your first day, it might not be apparent what each person will add to the group dynamic but over time you will gain a better sense of each person. You will begin to see differences in the way people learn and deal with certain types of problems. It is very likely that not all of the students in your group will share the same learning style. You will also see differences in the comfortability some people have with talking and sharing their ideas. Some members of your group will have no problem with speaking up and presenting their thoughts. Some others (or maybe even your whole group) will be quieter and much less inclined to speak their mind. You may have to deal with the dominance of one or a few people over the quieter members of the group. You will have to put special effort into making sure that all members of the group get a chance to participate despite the fact that some people may be quicker and more comfortable answering. Though it is good for the students to listen to what each other have to say it has to be balanced with a chance to explain their own thoughts. A quieter student will benefit way more if you put them in situations where they have to explain their reasoning on a problem and listen what others have to say in response as opposed to just listening to one dominant person talk all day. The considerations above are just a few examples of the things you will have to deal with when trying to figure out what are the best methods for the efficient function of your

group. If you do not work to integrate the different individuals into the framework of your group, a positive and effective group dynamic may never form. And sometimes despite your best efforts your group still does not feel comfortable working together. Some groups may never reach the performing stage but if you do your best to develop the effectiveness of the way your group interacts you give your group the best opportunity to reach that level.

So how do you facilitate the forming of a strong and effective group dynamic? You can't change the individuals in your group no matter how hard you try. But you can manipulate the situations that you put them in. One example would be in the arrangement of pairs or small groups. If you had simply put a dominant person in a pair with a quieter person, the dominant person might dominate the discussion of the problem. The end result is that neither has gained anything: the dominant person has not learned to listen to others' ideas and the quiet person has not gotten a chance to explain their thoughts. But if you were to assign the role of leader to the quiet person or put them in a pair with another quiet person they would get an opportunity to gain valuable experience and confidence conveying their thoughts to another person. Basically when picking pairs or small groups you do not want to just pick them randomly. Picking groups where the members complement each other or where the roles you assign them gives them experience getting comfortable with something they aren't used to is more valuable than simply getting the problem done quickly. You want to develop the comfortable relationship and confidence that a particular student has with the group regardless of their style.

Eventually the individuals in your group will become comfortable and confident with the way their learning styles and the way they attempt problems. To do this you will have to put people in many different roles and situations, especially ones they aren't used

to. This is difficult to do but the more you attempt to do it the more comfortable students are with working out different kinds of problems and working along with the group. Almost certainly some students in your group will struggle. Oftentimes it is not because of a lack in ability or due to the fact that they are a quiet type, but instead because they haven't gotten comfortable contributing to the group in that way yet. As hard as it is to put some students on the spot, it will become easier over time as they become more comfortable with the group and different situations. You will have to experiment with different combinations of students in different roles and in different situations. But in the end all of your subtle maneuvering will allow each member of the group to be confident, opening themselves up to where they complement each other, which overall builds a strong and effective group dynamic.

The Importance of Group Dynamics by Brice Sarver

Perhaps the single most important concept to establish in dealing with PLTL groups is that of the group dynamic. This not only has to deal with the way that the students interact with each other, but also with the way that the leader interacts with and motivates the students. It is crucial not only to foster an environment where it is possible to form a strong group dynamic, but also to find the means to make it persist throughout the semester. Without the presence of a good dynamic, it will be very difficult to keep the students interested and working with each other in a comfortable manner.

The first bonds that the group will form are with the leader. One of the biggest transitions that need to be made is the one from being thought of as a source of answers to being thought of as a student that has completed the class and is willing to work to help others. A great way to do this is to engage the members of the group – ask them about their weekends, their interests, any sports they may participate in, how their classes are going, etc. Bringing food or thinking up of fun ways to explain the material being presented is another good way to establish a good rapport with the group as a whole. Once the leader has been made available to the students in the group, it is time to begin fostering the interactions between the students themselves.

The student-student interaction is perhaps the most difficult to establish and maintain in a positive manner throughout the existence of the group. Students will initially be cautious and slightly nervous about interacting with each other in a study group environment, for the most part. It is the goal of the leader to break down these initial responses and turn the initial ‘pile of parts’ into a problem-solving machine. To break the ice between students, try encouraging participation in a small-groups or pairs

setting; don't let one student dominate the others. Also, be sure to mix up the way that the groups or pairs are selected. This is a great way to make sure that everyone gets to know everyone else.

As the semester progresses, students may tend to get on each other's nerves. Make sure that equal participation is enforced. If the problem set calls for round-robin, make sure that only the individual who is assigned to present the problem or write it up on the board is the one doing so. Resist the temptation to have other students 'help out' or even do the problem for the one who is supposed to. Along the same line, when students do not know how to begin solving a problem, ask them to check the board for formulas (if there are formulas that can be used) or consult their notes. This will help their understanding of the material as a whole and can also correct any uncertainty about the material presented in lectures. Resolve any conflicts between students that may arise from disputes about how something that should be explained or solved in a constructive manner. It may help to have disputing students explain why they believe something is correct in their own words and have the group participate in selecting the final method that they are going to employ. Maintaining a favorable environment is the best way to help the students get the most that they can out of PLTL.

Remember, don't try too hard to force the students to become friends or agree on everything; as a leader, one can only do so much to build the dynamic, but he or she is essential in both creating and maintaining it. Build a good dynamic, and the progress of the group will reflect it.

Diversity in PLTL by Rashied Amini

When I awaited my first PLTL session back at the beginning of the semester, I was curious to see what kind of students I would have. Would they be diligent, hard-working students who would attend class or the type who would come to PLTL as a sort of social substitute for actual attendance? Would they like my taste in deserts if I should care to bring them? Would one of them have a type A personality and drive more laid-back students crazy? Of course, I hoped more than anything else that we all just got along.

What I was wondering was basically a question of diversity. For most people diversity inspires images of people from many different cultures coming and working together by overcoming and in some cases using their differences. This, in the case of PLTL, is a very poor description of diversity. When I reflect upon the people I actually had in my PLTL, we were a fairly culturally diverse group, racially reflecting all the continents...except Antarctica and Australia. But then reflecting upon the experiences, I don't really feel that cultural diversity nearly affect our interaction as other forms of diversity.

Take for instance our political opinions. Seemingly irrelevant to my Physics PLTL sessions, it, for instance, had more impact on our group than did our cultural diversity. When my group slowly files in at the beginning of our PLTL session, we take a little bit of time to sit and chat about the week in news as the stragglers come in. In the case of my group, we had little apparent diversity in our political opinions, which allowed us to bond quicker by making jokes at certain politician's expense. Had we have been

more diverse in this area, it might have not have allowed for our group to be as close as it was.

While political beliefs might seem trivial, differences in peoples' work ethics are very important to the performance of your PLTL. First off, it's important to remember that not everyone in your PLTL will have the save devotion to your subject as much as you. You were selected to lead the group because of your performance in your subject; however, people that sign up might be looking for a quick review of the material every week in place of class, a helpful practice of material learned in class, or something in between. Additionally, I can assure that you will have different sorts of people in your PLTL. So what are you to do? Again, you have to be mindful of diversity, yet make sure that your PLTL performs as it should. People who habitually don't attend class will slow down the PLTL, but then again some people who always attend class and are very dedicated to PLTL may turn off members. In such a crisis, use what you have at your disposal: the PAM leader, other PLTL leaders, or use students of different types to work with one another to overcome their differences and shortcomings...if possible.

Last but not least you should be mindful of gender in your group and how gender diversity affects your group. While it may be a little sexist, women and men tend to behave different in small groups. For instance, men tend to be more outspoken and may need the presence of a woman to get anything accomplished. For my group, this was very true. As the semester went on, the female group members slowly dropped out of the group, leaving only the men. By the end they had, pardon the analogy, a lot of inertia—it took a lot of force to get them moving.

So when you first start your PLTL, look out for the different types of people you have in your group. Getting your PLTL to 'roll without sliding' will require you to use

the diversity, be it political, gender, racial, et al., of the students so that they compliment one another productively.

Diversity by Karan Chopra

With 500 students enrolled in General Chemistry I alone (not to mention physics and math), it is no surprise that one will encounter students with various educational and socioeconomic backgrounds. It is our job to be prepared to help. There is no single best way to accommodate all students, but it would behoove you to be conscientious and courteous to each and every member.

When dealing with students who may not have had the soundest academic background it is important to give them the same treatment as the other students. It is likely that they are already aware of their weaknesses and are working on them. Joining PLTL is a great place to start. As their peer, being in a place of power can sometimes create tension between a member and the leader. If this happens, try to deal with it by telling the whole group that your job is to help them and you have their best interest at heart (maybe not in such a corny way).

Most incoming freshmen have no idea how to study for Washington University classes. Some of us sophomores and juniors are still trying to figure it out. There are certain qualities that they will bring with them, some must be reinforced and others they must be forced to shed. Dr. Frey presented slides that deal with some of these aspects. An important message from these is that most male students receive preferential treatment in their grade-school years. Many guys are used to having the liberty of taking their time while answering questions, blurting out answers, and being assertive in the classroom. Till now, these behaviors were condoned. In the Washington University community, as many of you know there is little preference for students in general given the large classroom sizes.

Do not try to overcompensate towards students who you believe have been oppressed or given less attention in their learning background. It will backfire. They are not used to this extra attention and giving this extra attention will feel threatening and will be counterproductive. Instead, try giving equal attention to all students, and spend the same time correcting or mentoring each student, as Dr. Frey mentions in the Diversity presentation. This will help build a group dynamic that is effective for all of the students to learn in.

In order to foster the optimum group dynamic, you must demand participation. This means being sure to call on all students, even that really quiet one. If you are unsure about the students' capabilities and fear embarrassment, then call on them to answer a very easy question. Slowly begin asking more difficult questions till the student has developed confidence and comfort in the PLTL group. Sometimes this can make all of the difference. Another way to maximize the efficacy of your PLTL group is to demand some sort of answer when you ask them a question. Saying "I don't know" is a very lazy response. Have the student take out her/his notes, book, and make some sort of an effort to learn.

As the semester progresses, the dynamic of your group will reach an "equilibrium". This is what you should work towards each week. You know you are doing things right when the group is not being dominated by the two aggressive students who already know all the answers, and when even the shy students are voicing their opinions on how to think thorough certain problems. Being a PLTL leader is not easy; however you will learn how to be aware of the diversity of learning backgrounds in the Washington University community. Best of luck to you.

Dealing with Diversity by Greg Gilbert

One of the more important issues to be aware of when leading a PLTL group is the diversity of the students within the group. Diversity here does not so much refer to diversity merely in the traditional sense of race or gender, but in the ways that diversity between the students' personalities and backgrounds leads to diversity in the ways that students think. Two of the more prominent factors of diversity that will affect a PLTL group's dynamic are distribution of age and distribution of gender within the group.

Although many of the chemistry and calculus PLTL groups will likely be fairly homogenous in terms of age structure, for the physics groups age differences become a dominant factor in determining how a group functions. Engineers take physics freshman year, architects take it sophomore, and premeds take it junior year. So, the age composition of a physics group can end up being quite diverse. While it is less likely, other subjects can lead to a variety of ages in a PLTL group. Students in each year will need to focus on different aspects of the curriculum in PLTL. Freshman will probably be more concerned with just learning the material, when in fact the most important thing for them to learn is often methods for approaching problems. Sophomores and juniors will already know how to study, but they may still need to learn new habits tailored towards the specific subject. In addition, a problem that may arise due to age differences is that students may try to establish a hierarchy within the group. The way to avoid this is simply to treat all the students as equals. Similarly, one can avoid offending students older than the leader by treating them as peers, not students.

Another factor that will affect group dynamics is gender. In general, males and females will have different learning styles. However, individuals vary, so gender is not

necessarily a good predictor of how a student will act in PLTL. Instead, the male/female ratio will have a much greater effect. A predominantly male group will function quite differently from a predominantly female group. A completely male or completely female group will present unique problems as well. In the end, however, all groups will function differently so that it is up to the leader to determine how to best guide interactions within the group.

While diversity presents challenges to leading a PLTL group, it also allows for a wider range of thought. Diversity of students means diversity of approaches to problems, which will lead to better understanding of the material for all the students. The role of the leader is to help the students use their diversity for their betterment and the betterment of the group.

Dealing with Academic Diversity in PLTL by Thomas Loh

It is obvious to new PLTL leaders after their very first session that on the major hurdles that they must overcome is the diversity of students that they must lead. Students come from many different backgrounds and leaders must learn how to match their teaching or leading style to fit their mix of students. While the observation that all of the students are different may be apparent at the very beginning of your session, some forms of diversity are less noticeable at first and yet can cause problems later on in your group. One such form is academic diversity, which I would define as the differing levels of comprehension of the material, which translates into a disparity of grades within your group.

Very few PLTL groups have a homogeneous body of students who feel the same level of comfort with the material which will usually lead to a wide spectrum of grades within the group. Some students will pick up the material faster than others, some will know that they will have trouble with particular sections and will work very hard to understand the material, while some students will have a hard time understanding the material even while working hard and others will simply be too lazy to do enough work to adequately understand the material. All four of these character types appear in the typical PLTL group to a certain degree. Some of these character types will even manifest themselves within the same individuals at different points during the semester or different sections of the material. Understanding these character types and being prepared for them are important for maintaining a good PLTL group and also avoiding tense and uncomfortable moments.

A good example of the consequences of NOT understanding these character types is what happened to my PLTL section after the first test of the semester. In trying to be friendly with the students, I asked them as a group what they thought about the exam that they had had a few nights prior. I thought that it might be a good topic to talk to the students about for several reasons, not the least of which was trying to find what they were having the most trouble with. However, as one might have guessed, this topic backfired on me and sent my group into a very awkward situation.

After I asked my initial question, the first student to respond said that he had found the exam to be, “ridiculously straightforward and simple”. I thought to myself, “wow, that’s good, I guess it wasn’t as hard as it was last year.” However, after that one student finished his comments, it was very difficult for me to get any other comments about the exam from the other students. Upon later inquiry of the other students individually at a later time, I found out that most of the students had found the test to be extremely challenging and many of them hadn’t done nearly as well as they had wanted to. However, after that first student had talked about how easy the test was, none of them felt comfortable telling the group that they had had trouble with most of the exam.

Not only did that student’s comments make talking about the test difficult, but it also set a very different tone for the remainder of the session one, which was filled with anxiety and tension between members who were afraid to look like they didn’t know what was going on in the problems that we were working. All of this could have been avoided if I had understood people’s reactions to others who seem to find what they find difficult, easy.

I don’t think that one should read about my experiences and think that you shouldn’t talk about exams or topics where people have had different experiences. I

think that talking about exams is an invaluable tool for a PLTL leader to evaluate how their students are doing as well as how effective of a leader they are. However, a certain level of tact must be employed by a PLTL leader when approaching a topic that has the ability to become as combustible as exams and grades. It might be a good idea for instance to informally survey your group about how they find the material and make predictions of how the students will do. In my group, I know that if I had known to look for it, I would have instantly seen that several of the students without working much harder would have difficulty on the exams, and I should have seen that at least one of the students was likely to out perform the others on the exam and that the I was heading for trouble.

My advice would be to new leaders, is to take the time early on to diagnose whether or not your group is varied enough to warrant a less direct approach to discussing exams and grades. It will definitely be worth it, especially if you can avoid these awkward or tense sessions.

Satisfying a Diverse Octet by Jamie Resnick

While the range of diverse students is one of the first realizations to make at Washington University, I never thought to consider the difficult role that diversity played in the group dynamics of PLTL. While one's initial reaction to diversity usually entails race, I recommend looking at the "faces" roster posted to Telesis prior to that first PLTL session. My group, on first appearance, was extremely diverse in this regard, and almost immediately, it was apparent that some students had already met through the several on-campus multi-cultural student organizations. While students may not necessarily be so integrated in their activities outside of PLTL, I can't stress enough the importance of switching seats around and constantly changing the "small groups" and "pairs" to diminish these intangible racial boundaries.

However, the next most apparent role in diversity comes with gender. The exceptions definitely exist and are worth mentioning, but males tend to be a bit more outspoken (whether right or wrong) while the females are more reserved and chirp in only when the discussions are not dominated by a male. Again, switching small groups and pairs with regards to gender will offer noticeable differences. With a little bit of encouragement, the females in the group will begin to participate just as much.

Although my group was entirely comprised of freshmen, be sure to withhold the stereotype that your Chemistry PLTL group members are all pre-med freshmen. There are several students who take chemistry, calculus, and physics for reasons other than requirements and by not making assumptions, you open the door for them to feel accepted into a group where they may not be in the majority. Also, older students who have sat through college science exams may already know what to expect and how to

study. You need to find a way to pique the interests of these students as well to maintain your attendance. Another component to diversity involves the different levels of background academic knowledge in a particular subject. Are students coming from competitive, small private schools where they were prepared with several AP courses and graded on a curve or are they used to large public school classes? These different high school backgrounds can definitely impact the motivation, openness, and willingness of students to want to work and help one another.

Perhaps the most important aspect of diversity that is only apparent after several sessions of careful observation is that different students apply different learning styles to the material. There was a clear distinction between the math/equational types of problems and the conceptual/pictorial problems, and students tend to be more comfortable with one type of problem than with the other. For this reason, it is imperative to repeat answers out loud and write all equations and steps out on the board. Have your math people draw out pictures and make the conceptual people explain the steps of an equation back to the group. Constantly challenge them. Your extreme visual and auditory learners will appreciate this. By catering to all types of learning styles, you'll have your group coming back week after week to learn and ask questions in an environment that feels conducive to their needs in a particular subject.

Maintaining a Good Attitude by David Eby

Over the course of a PLTL leader's first semester, they deal with problems on two fronts. First is the problem of balancing the group dynamic. The second is a more personal conflict of how to deal with the stress of leading one's peers. This problem includes quite a bit more than may appear on the surface. One of the primary parts of this is learning to cope with problems brought by the group members while accepting that some problems aren't the responsibility of leader. The key to this problem, along with so many others in the PLTL format, is to balance the elements of leadership with maintaining a peer-like relationship with group members. This allows the leader to move forward with the group while maintaining a personally positive attitude.

My group experienced several problems related to attendance over the course of the semester. This resulted in several students being asked to leave and others deciding independently to forego further participation in the PLTL method at varying points through the semester. Many problems of this sort result from poor communication between members and leaders of the group. Sometimes group members, despite warnings of the contrary, see PLTL as an optional activity; in other words, members may believe that studying for exams or other commitments are more important and have a higher priority. What they may not realize is that if even one person is absent from the group it creates a problem as an integral component of the group is now missing, forcing the other members to scramble to adapt to a different configuration instead of allowing everyone to grow more comfortable with everyone. These problems can become paralyzing if not addressed and can become serious impediments to the continued development of the group dynamic.

There are several remedies to these problems. The first is to make sure that the group members have signed something stating their intent to attend as many sessions as possible, arrive prepared, etc. By putting these commitments in writing, the student is making participation in PLTL more concrete and tangible. Another suggestion would be to dedicate time the first session to creating a rule list describing in detail what the students are agreeing to and how they propose to fulfill their part in the group. Rather than leaving this activity to later in the semester it is important for the group members to set up the group's expectations of each member. In addition, the leader should try to be sociable and friendly with the group members even outside of the session. One way to get involved with your students is to just say "hi" and ask members how they are coping outside of a formal meeting. This allows more control and a feeling of tighter community leading to more productive sessions. By integrating these methods into the structure of group sessions many of the problems specified above are resolved.

In conclusion, a PLTL leader must maintain an optimistic and positive viewpoint for the benefit of their group and themselves. Becoming a quasi-teacher can be very stressful as any first-time leader can attest to anxiety just before the first meeting. The key is declining the responsibility and mandate to fix every problem the group encounters. Even though people may leave your group, as they did mine, the primary reasons will not be the leader's fault. In addition, most reasons a group member has for leaving are their own issues and unrelated to the leader. In maintaining a good attitude you stand a good chance of forming friendships with your group that allow everyone to work better.

Ionic Bonding

by Candice Fletcher

The past semester as a PLTL leader has really been a great experience for me. Ever since I was a student in PLTL as a freshman in general chemistry, I knew that I wanted to participate and be a part of encouraging and leading the other students as they battled their way through the jungle that we like to call Chemistry 111. Drawing from my experiences in PLTL and as a PLTL leader, I have realized that forming a relationship with the students is nearly as important as knowing the material, being prepared for session, and being committed. So what I want to suggest to anyone that may be reading this essay is that you try to immediately form a relationship and a bond with the students in your section.

Your trying to form a relationship with the students has to begin the very first day of PLTL. Everyone comes in nervous and wary of being in a new school taking college classes, and you as a PLTL leader are suddenly in the leadership position. A few things are very important to starting the session correctly. An e-mail before PLTL is always key. You will want to introduce yourself and voice your excitement about being the leader. That will excite the students and show them that you too are excited and I'm sure that they will appreciate the effort that you are making to reach out to them. Also, on that first day be sure to bring food to the students and try to know their names ahead of time which also will show that you are trying.

Over the course of the semester, you want to show an interest in the students. Take time out of every session to ask how other classes are going, how they are enjoying school, what they did over the weekend etc... Also ask them how the material was for the past week, if it was difficult and reassure them that you too were once a student and that

the material was hard for you too. By asking these questions you will really begin to know your students in more than just an academic setting, but also in more personal ways. I have found that the more ways that you can relate to the students, the more comfortable they will feel.

Another key thing that will help you form a relationship with the students is acknowledging their presence in other places. When you see them around, especially at the beginning of the semester, be sure to say “Hi” and reach out to them. This will not only be a nice way to welcome them to a whole new place, but also to show that you want to be friends.

By first trying to form a relationship with all the students you will be setting the atmosphere for a more positive and fun semester. The students may actually be excited about coming to PLTL, and can better appreciate you as a leader. I once heard that many of the students look at the PLTL leaders like some type of chemistry geniuses, and that it is way out of reach for them. What we must force them to realize is that you too have been through chemistry and that it is doable.

Don't Take it Personally
by Nicholas Okoro

I started my job as a PLTL leader with ambitious excitement. Determined to be the best PLTL leader ever, I envisioned guiding a group of motivated chemistry students who with PLTL and my useful advice were going to ace Chemistry 111. With the vision of helping students master Chemistry in my mind, I entered my first PLTL session ready to share my enthusiasm for the group with everyone else. The students were not even close to my level of excitement during the session. I was not jumping off walls myself, but I did find pleasure in leading the group. By the looks on the faces on some of the students of the group, I could tell that everyone did not feel the same way. Being an optimistic guy, I attributed the humdrum atmosphere to the newness and possible shyness of the group. The next week, I returned with an equal amount of excitement for the session, but this week I could clearly tell that at least one member of the group just did not want to work with others. When I called upon this individual, his body language said “Why am I here!” For the most part, he answered questions correctly, but he displayed a sour attitude whenever I asked him to explain to the group his process of arriving at the answer. I reasoned that this particular student would require more time in adjusting to how PLTL works. Unfortunately, he did not give PLTL the time to grow on him, because he never returned to our session. When I thought about being a PLTL leader, I always pictured students working together, solving challenging problems, and making complex concepts understandable. I never thought about students getting frustrated with the group and even worse, quitting.

Initially, I did not completely understand how to view the departure of this student. One thought that ran through my head was that I was doing something wrong as

a leader. Although I did all the problems before hand, reviewed the concepts, and attempted to prevent too much confusion within the group, I felt as if I was not doing enough. I did not want more students to quit, but I was unsure of how to retain them. I decided to try running the PLTL session a little differently each week, just to keep things fresh, but before I really started to implement my idea, I saw that students were opening up and really getting into the PLTL philosophy. I think they really began to appreciate PLTL. That is when I realized that everything in my group is not under my control and everything will not be under yours.

PLTL is not for everybody, so if a student loses taste in it or even quits, you may not be the one to blame. You are always encouraged to reflect on your progress as a leader and the areas you can improve upon. So when students do not look like they want to be there or they quit, think about how you are running the session and what you can do better, but do not beat yourself up when one student loses interest in the group. Focus your energy on doing your best for the sake of the students who need and appreciate what they gain from the group. Don't take one person quitting personal, because your job is to make the best working environment for the entire group, not just one person. Prepare before your session, respect all individuals in the group, and be excited, and let everything else fall as it may.

Good Food, Good Company and Good Chemistry by Elizabeth Germino

Admittedly, spending two hours of every week on an intro science or math course is probably much more fun when you're being paid to do it, but I think it is in fact possible for students to enjoy themselves at PLTL. My group this year was actually disappointed to hear that we were not meeting the week of Thanksgiving break. Now, I did get into a habit of bringing baked goods every week, and although this fact was greatly applauded by my students, it was not the only reason they would miss getting together.

What made our PLTL group so much fun was the sense of community we had established. I was fortunate to get a group of students whose personalities didn't clash, but it also helped that the atmosphere of our meetings was very positive. I can be a very shy person at times, and so in the beginning I went out of my way to be friendly and make lighthearted comments when appropriate. I flat out insisted that everyone must participate, and my joking groan when no one was talking would get the students to laugh and speak up again. I tried to be casual and informal, because the subject material (chemistry) was intimidating enough and was in my opinion most readily embraced in a relaxed setting.

Another thing I did as leader was, at the very first session, emphasize the point that it was all right to make mistakes and to ask for help. We all agreed that no one would be criticized if they were wrong, and so that there should be no pressure whatsoever when attempting a problem. This made problems such as round robin more interactive; instead of a student fumbling around when they were stuck, he or she was not afraid to turn to the rest of the group and ask for help. The group would then work

together to get everyone on the same page. Several students told me in an informal survey I gave at the end that this was one of the things they liked best about PLTL.

And of course, enthusiasm is contagious. Chemistry happens to be one of my favorite subjects, and I particularly enjoyed the subject matter we went over in PLTL. Although I don't think many students ended up sharing my exact sentiments, they certainly did not come out of Chem 111 hating it, and they were able to see the relevance chemistry had to the rest of their studies. In my enthusiasm, I had a habit of asking questions that would not necessarily affect their test scores, but that would get the group discussing applications of the chemistry we were learning. For instance, when we were talking about boiling points one session and came across NaCl, there was some conference as to how it ranked in comparison to water. After they decided that it had a higher boiling point because of ionic bonding, I asked, "So who here throws salt in the water when you're cooking pasta?" And it was quite gratifying to see the looks on their faces when at that moment it clicked; the water and salt solution would boil at a higher temperature and thus cook pasta faster. Their intro chemistry course was able to give them a deeper understanding of an everyday occurrence.

Of course, one does not have to bake cheesecake or come up with exciting examples of how the material relates to the real world to have a fun and successful PLTL group. I think the real key is effort; if you want to be there and enjoy being there, it shows and the group follows in suit. With your effort, you are saying that PLTL is worth it, and thus define for your students the value of PLTL. A friendly and fun PLTL leader (who also watches that the group stays on task) sets the tone for a semester of college peers enjoying time together as they work through and help each other with chemistry problems.

Making PLTL Fun

by Pamela Ju

What exactly is fun? According to www.dictionary.com, these are the three possible definitions:

1. A source of enjoyment, amusement, or pleasure.
2. Enjoyment; amusement: *have fun at the beach*.
3. Playful, often noisy, activity.

You probably knew that, but it's added here for clarification. Now, the real challenge is, how do you make giving up two hours of a weekend to do Calculus/Chemistry/Physics problems fun? Well, what else would the students be doing on a weekend, if not homework? Some options that come to mind are sleeping, partying, or hanging out with friends. You obviously can't integrate the first two activities within the structure of PLTL. The last one, however, you can.

My first weekend as a leader was a bit nerve-wracking. I had been in Chemistry PLTL, but here I was, a Calculus leader who was going to try and help them on topics that I hadn't thought about since my senior year of high school. I was sure they were going to realize that I was a big phony. Nonetheless, I showed up early, wrote everything out on the board the way we had learned it in the SAM class, and waited. A couple students showed up on time, but, of course, there were a few that were late. Suddenly, I was struck by this horrific realization that I actually had to *talk* to the students that were there on time. *And* these had to be things that weren't PLTL-related, since I didn't want to end up repeating myself. Once I realized it though, it made sense. After all, these students were only a year below me, and even if you are a Physics PLTL leader and the students are a year or two above you, in the end, does it matter? If it was any other

situation, then no, not really. So, it shouldn't bother you here. After all, you are their *peer* leader, and they are your peers. Soon after that, I realized that that was really the key to making PLTL enjoyable – be friends with your students and encourage them to be friends with one another.

Of course, we all do icebreakers, and they are, in fact, a great way to learn a few perfunctory things about everyone: name, class, major, and occasionally 3 weird things about themselves. However, icebreakers are only semi-useful (surprisingly enough) for breaking ice, and not so great for actually knowing anything about a person. So, talk to your students. Let them complain about their professors, and, if you're comfortable with it, talk about things that aren't even remotely PLTL-related, like what you did over the weekend.

This isn't to say, just spend the time you should be doing problems on chatting. Even the students wouldn't be happy with that; they did come to learn something, after all. I, personally, though, feel that the students are aware enough of why they are there that you don't need to dictate the group into doing the problems at a certain pace. Let the students feel, even if it's actually and unfortunately untrue, that they are having fun. Students learn best in a group environment when they are comfortable enough to ask others to help them when they don't understand something. This means making sure that everyone feels like an equal, even yourself. One of the biggest problems we face as leaders is to fight the urge to simply teach them the material. However, if you make yourself out to be on equal footing with the rest of the students, they will turn to their classmates, and, in turn, will hopefully stop thinking of PLTL as a mini-classroom and more as what it should be – team learning. That, in and of itself, should be fun. As one of my students this semester declared every time we broke into a small groups problem,

“GO DREAM TEAM!!” It is quite possible that he was simply an overzealous guy, but working together with your friends can generally help make PLTL not only a useful, but also a “playful, often noisy, activity.”

PLTL – Keep it Entertaining by Robert Schuh

Who would think that a two-hour study session with complete strangers could be fun and exciting? Luckily for you, you can make your students feel just this. By molding an enjoyable atmosphere for your students to work under, you'll find that your job as a Leader becomes much easier.

The absolute foremost importance in keeping 'the fun' in PLTL is encouraging student-to-student relations. If your students don't feel comfortable around one another, they won't feel comfortable in the study session and they won't look forward to coming to PLTL each week. The first few weeks will set the tone for the remainder of the semester, so be sure to pay attention to everyone's social behavior and adjust your teaching methods accordingly. If you find certain group members often speaking directly to you rather than the group, just ask them straightforwardly to address their question to the group. Once everyone has gotten to talk to each other a few times, they will be much more willing and able to help each other learn the material.

The students can also become more comfortable around one another through non verbal methods. Try having the students move around often during the problem sets when you split up into groups. This makes sure that everyone has equal opportunity to work with everyone else and see problems from different perspectives that they might miss if they only worked with one or two other people. Getting up and moving around also breaks the monotony of solving problem after problem. A simple change of scenery from one side of the room to the other will re-engage the students' interest and promote them to interact.

Once your students have become comfortable with one another, you'll have many ways to keep the atmosphere fun. The best method I used for the purpose was giving the students about ten minutes to talk to one another before actual work started. I would wait out on one of the couches in the lobby and have all of my students join me as they arrived. We would then all proceed to the study room as a group. This gave the students an opportunity to warm up to one another and allowed them to develop relations outside of pure work and as such get to truly know one another.

During session, you will need to think of ways to keep the students interested while still keeping them focused. Sometimes, on the longer problem sets, I'd bring something up towards the middle like a movie I'd just seen that would lead to a little conversation. Staying entirely focused for two consecutive hours is a lot to ask out of a student. If you are pressed for time, you can still allow them to have some fun in between problems. One method I ended up using fairly often in my sessions was letting them act in the facilitation of the group. For example, one problem set had a massive thirty or so quick answer questions that really bogged my group's tone down. To pick things back up, I'd have the person at the board choose the next person to go to the board based upon something like, "a boy with a green shirt" or "someone with blonde hair." This still allowed me complete control over who was answering when through the pointing of my criteria but also allowed them to feel more involved.

No matter how difficult the material is or how much stress the students feel, it is important to keep a fun atmosphere in PLTL session. Keeping session exciting will motivate everyone to keep their attendance and preparations levels on the high end and ultimately lead to successful peer learning.

Ways to Make PLTL Fun: Avoiding Awkwardness by Pankti Shah

“So what do you guys think?” I scanned around the table to the eight students only to see eight, blank faces staring back at me. To offer help now would be demeaning – I hadn’t even given them more than three minutes. But the air started to grow thick; the ticking clock seemed to move slower. “You can look in your notebooks if you need help.” I desperately resisted the urge to just shoot out the answer and move onto the next problem. Unfortunately, the next problem brought up the same, exact situation. Why weren’t they talking? Were they scared to answer wrong to the question? Were they unprepared? Or, did they just not understand the material? Problem after problem, accompanied by one long silence after another continued through that whole session.

Come Tuesday, as I sat in our SAM session with Dr. Frey, I began to understand what went wrong. Dr. Frey asked, “What did you guys do this past session?” Answer: nothing. “Did you try anything new?” – No. “Do the students seem to be grasping the material?” – Not from what I see. “Are you getting to know your students better” - clearly not. “Are you guys having fun?” – Definitely not.

We went around the room, and students told stories of the difficulties they had. Problems ranged from over-dominating students to students who don’t show up; students who had difficulty understanding the material to kids who knew too much and forgot the concept of team. What was my problem? Nothing – that was it - The simple fact that my group seemed to be accomplishing absolutely nothing. The students were not making friends, were not making progress in chemistry, were not expanding their problem-solving abilities and they were making absolutely no effort to work as a team.

Soon after, I realized what we were missing. I needed to find ways to just make PLTL more fun. That's it.

It was more than the simple ice breaker we did at our first PLTL session. It was more than bringing a variety of snacks every weekend to encourage the kids to come every time. From then on, I learned to avoid open-ended questions. I started talking to individual students before the session to learn more about each and every one of them, individually. I started sitting down with the group during the session to avoid the role of an intimidating teacher instead of the friendly leader I was supposed to be. I started cracking jokes (though they might not have been that funny) to lessen the tenseness. And, after the students were more comfortable with me, I worked with them to work with each other. At the end of PLTL, they started to see each other as friends instead of classmates. The most effective thing, I thought, was to try and make all the activities as interactive as possible. Just simple things like taking in the x-y-z axis (made of pens and pencils) to help the students understand the wave functions makes such a big difference in the group dynamic and the quality of understanding and actually retaining the information.

PLTL is not an experience where the students come to learn chemistry from the leader; if it was, PLTL would definitely be a bore. But, rather, it's the PLTL leader's responsibility to make PLTL more enjoyable. The ice breakers and the food are just the tip of the ice berg. By being an interactive, friendly, and attentive leader, it will be easy for your PLTL group to soon become a team of friends who will enjoy doing their problems together.