

## Helping Groups Learn

Working in groups is a skill that must be examined and practiced in order to improve - just like any other skill. In the working world, your skill in teamwork will have a great effect on your future success and happiness so an investment of time and energy now will reward you greatly in the future.

1. Describe the behaviours or habits of the members of a well-functioning group.

Recorder: \_\_\_\_\_

Manager: \_\_\_\_\_

Speaker: \_\_\_\_\_

Organizer: \_\_\_\_\_

[C][K/U][T/I][A]: 0 1 2 3 4 5

We have all experienced difficulties working in groups. Sometimes, the challenge comes from within – for whatever reason you, as an individual, are unable to contribute effectively to the group. Other times, another group member may make the proper functioning of the group difficult.

2. Think about the reasons why a group might *not* function at its best. Make a list of the reasons in the chart below – be specific. However, do **not** mention the names of any individuals. This is **not** a critique of your current group.

Reason	Actions
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

3. Discuss some concrete actions members of the group can take to help each situation. Record your actions and the class discussion in the “Actions” column.



4. Individually, reflect on the list of reasons and try to determine which might apply to you! Be brave and jot down which reasons they are (you don't have to show the others!) – it is important to remind yourself what you might need to work on.

5. Individually, reflect on the list of actions. Which ones are you comfortable carrying out? Which ones should you encourage yourself to try more often?



## Group Learning

### The Idea

Think of your group as your learning team - the people who will help you learn science. Every student is expected to take-up a specific role within the group and to carry out the responsibilities listed below. Members of every group will evaluate one another on their performance in their respective roles. Roles within a group must change for each new task or activity.

### Group Roles

#### Group of 3:

Actions	What it sounds like
<b>Manager</b> <ul style="list-style-type: none"> <li>Make sure everyone has read the initial instructions before starting.</li> <li>Direct the sequence of steps.</li> <li>Keep your group "on-track."</li> <li>Make sure everyone in your group participates.</li> <li>Watch the time spent on each step.</li> </ul>	<i>"Has everyone had a chance to read this before we continue?"</i> <i>"Let's come back to this later if we have time."</i> <i>"We need to move on to the next step."</i> <i>"Ralph, what do you think about this idea?"</i>
<b>Recorder / Checker</b> <ul style="list-style-type: none"> <li>Act as a scribe for your group.</li> <li>Check for understanding of all members.</li> <li>Make sure all members of your group agree on plans and actions.</li> <li>Make sure names are on group products.</li> </ul>	<i>"Do we all understand this diagram?"</i> <i>"Explain why you think that."</i> <i>"Are we in agreement on this?"</i>
<b>Speaker / Motivator</b> <ul style="list-style-type: none"> <li>Speak on behalf of your group when called upon in class discussions</li> <li>Help your group avoid coming to agreement too quickly.</li> <li>Make sure all possibilities are explored.</li> <li>Suggest alternative ideas.</li> <li>Energize your group when motivation is low by suggesting a new idea</li> </ul>	<i>"What other possibilities are there?"</i> <i>"Let's try to look at this another way."</i> <i>"I'm not sure we're on the right track."</i>

\*\*If you have more than 3 members to your team, the forth role will be the assistant manager who will help with any additional tasks that the group feels are necessary for success.

**In a group of four**, the addition of the *Organizer* can be added.

Recorder	<ul style="list-style-type: none"> <li>The groups' whiteboarding exercise is documented in paper form as a final draft of the group's discussions.</li> <li>The recorder must ensure that the voice of all group members is included in the documentation.</li> </ul>
Speaker	<ul style="list-style-type: none"> <li>Is the spokesperson for the group. If the group encounters difficulties, this is the person who formulates the question to ask.</li> <li>When the teacher comes around the check the progress of the group, the speaker is the initial point of contact with the group.</li> </ul>
Manager	<ul style="list-style-type: none"> <li>The Manager is in charge of time management to ensure that the task is completed within the time allotted.</li> <li>Ensure that each group member understands before the group continues.</li> <li>Ensures that all members are on task and engaged in the activity/discussion.</li> </ul>
Organizer	<ul style="list-style-type: none"> <li>All equipment and materials must be accounted for during the task and returned at the end of the task.</li> <li>Ensure that each group member has an opportunity to contribute to the task.</li> </ul>



## Seating

When working in groups, please sit at the desks so that you are facing each other. You will need to adjust your seating so that all members of your group can be a part of the discussion/activity. (See Figure 1)

## Whiteboards and Discussion

One of the best ways to share work and ideas is using a whiteboard and your group's common workspace. This is much easier than all huddling around one sheet of paper. Please use these regularly!

Focused discussion on the task is highly encouraged. The teacher will continuously listen in as you work through the activity. The teacher's role is not to provide answers but to be an observer as your team works through the problems. The teacher will ask questions to help guide your learning. Don't worry about "right answers". This process is about making mistakes and working through your ideas for stronger understanding. Don't be afraid to take risks!

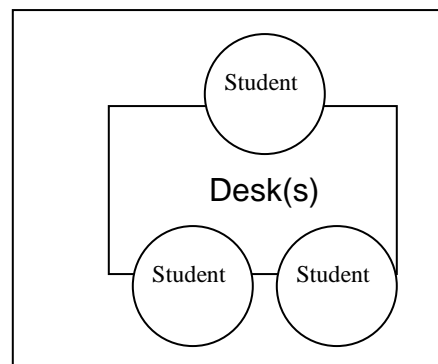


Figure 1: Example of student seating

## Group Assessment Procedure

The marking system for group work is outlined below. Work may be marked for a combination of completion, knowledge and understanding, thinking and inquiry, application and communication. The specific combination of the categories will vary depending on the task. Most group work is treated as assessment – feedback from me on how well you are doing with the new science ideas. Only certain tasks will count as evaluation towards your final grade. You will be provided with opportunities to develop your skills before an evaluation is completed.

<b>0</b>	For absent or totally unacceptable work.
<b>1-2</b>	Seriously deficient and lacking in fundamental understanding. The effort put in towards completing this task was minimal.
<b>3</b>	Shows basic comprehension but requires improvement. Group must formulate and ask more questions to complete the task with more focus.
<b>4</b>	Good work which meets the expectations. The activity is completed with success. Questions were asked with clear focus. Answers are clearly explained and demonstrates a strong understanding of concepts.
<b>5</b>	Exceptional work! Demonstrates a thorough understanding and examination of the topic. The question is thoroughly and thoughtfully answered. Ideas are extended into new contexts. Connections are made between previously learned ideas. New questions are formulated for further investigation.

## Taking Notes and Homework Problems

### Taking Notes: The Idea

This course has been designed to maximize the value of our classroom time together enabling us to investigate concepts through activities and problem solving. For this reason, it will be important to complete some note taking from time to time in order to prepare for the lesson in class. The majority of the information that you must read and summarize will come from the textbook. In most cases, the text does an excellent job introducing and explaining the new topics, so you will create your class notes directly from that. There are some cases where the text is lacking, and so I will provide very short lessons or alternate readings to fill those gaps.

### Why You Will Take Good Notes

Reading is great, but for most of us, it is a very passive activity. We tend not to read critically, meaning we do little to digest the ideas and confront them head-on - basically always asking the question, "Oh really, why?" Good notes will provide you with a valuable summary of the course contents when the time comes around for a test or an exam, precisely when time is in shortest supply. The final reason why you will take good notes is that I require you to! I will occasionally check on and mark your production of notes, with and without warning.

### How to Take Good Notes

Read the entire assigned passage without taking notes. Always ask yourself the question "Oh really, why?" as you go. Take your time. Organize your note page for maximum utility. They should all go like this:

#### Sample Notes

	Pg. 12
<b>Unit:</b> Forces	
<b>Topic:</b> Newton's 2 <sup>nd</sup> Law	
<b>Text Reference:</b> pg. 77, 81-2	
Idea:	
Definition(s):	
Key Examples:	
Problem: pg. 80 #1	
<i>etc.</i>	

- **Number your note pages** to help keep them organized. Include the text reference so you can easily go back and double check things when necessary.
- **Never just copy information out of the text.** That is as useless as mindlessly copying down notes from a powerpoint/blackboard – we are trying to avoid this. Begin by deciding what the important idea or concept is, and use the text to help you describe it. In a given reading usually there is only one or maybe just a few key ideas. Be brief but use correct terminology. Write in point or sentence form.
- **Emphasize the definitions** of new, important terms.
- **Provide key examples.** This may be an explanation, description or a calculation. Try to decide on the most relevant or useful ones. The text is always there to provide the rest.
- **Check the margins and diagrams and graphs!** These illustrations often contain very important information.
- Repeat for each important new idea you identify.
- **Quickly scan over the final note and ensure you have covered the important ideas,** not missed anything critical and that it makes sense.
- I will check whether these things are present in your notes. The exact layout is up to you (colour, underlining, etc.)



## Homework Problems

The purpose of these problems is to give you an opportunity to try out a new skill or wrestle with a new concept. The chosen questions focus on the key ideas and skills of the topic, and are absolutely critical that they are completed right away.

1. **Solve your problems in your regular notes**, immediately following your summary of the readings, as shown above. **Reason:** *This keeps you organized and encourages you to do it right away rather than wait until the weekend.*
2. **It is not necessary to copy out the question** – you can always look back at the text. What you should do is **provide a complete process for each one and a simple diagram**. This does not mean something lengthy, but rather something complete. **Reason:** *When it comes time to study for a test or the final exam, time is always in short supply. Don't skimp now on your work and leave yourself with something that is of only marginal use as a study aid.*
3. When solving your problem, pretend a good friend is sitting beside you - one who has a particular habit of constantly asking one question over and over: “why?” or occasionally, “huh, how come?” And try to explain to this friend how you chose to do each step, why it works, or why it's important.

**Stuck?** We often are - all of us! Talk and check with your team members regularly about the problems – especially if you finish your team tasks early. **Make arrangements for extra help.**

The key to success is *“Recognizing that you are not understanding **AND** asking questions to address the issue”!*



## Introduction to Cooperative Group Problem Solving (CGPS)

The purpose of this problem solving strategy is to help you learn the more sophisticated techniques that experts use. The focus here is thinking about the problem and planning **before** starting the math work. It is **very** important that you complete each step in the given order and avoid the temptation to jump ahead (especially to the math work). The manager has the critical role of ensuring this. The solution sheet will help to keep your group on track – be sure to fill it out as you go.

**Best way to work:** As a group, start each step by jotting down ideas on the whiteboard. When they are agreed upon and understood, the recorder writes out the good version on the solution sheet. The group should agree on and understand everything that is written on the solution sheet.

### Set-up

#### A. The Picture

- Draw a clear diagram showing what's happening
- Attach the important information to the diagram using simple phrases
- Make any important measurements
- Attach the unknowns to the diagram if possible
- Indicate the coordinate system and sign convention

**If this step is complete, you should never have to refer to the problem statement again.**

#### B. The Question

- Create a specific physics question that will give the answer to the problem.
- Indicate which quantities will allow you to answer the question.

#### C. The Plan

- List any important physics concepts or ideas involved in the solution.
- Outline the key steps in solving the problem
- List any useful “textbook” equations (i.e. found in bold / in a box in a text) and any other relationships you will use

**Have you carefully completed all the previous steps? If not, go back! Note that you should not have done any real math work yet.**

### Execution

#### D. The Work

- Create the specific equations you will use –write them down with a simple statement explaining what you are doing.
- Perform the algebraic manipulations first, whenever practical.
- Verify the units of the final derived expressions.
- No number crunching yet!

#### E. The Results

- Substitute numbers into your manipulated equations and calculate a result.
- State the final answer in response to the question you created.
- Write brief statements explaining why the answer seems reasonable in size, direction and units.

