Forms for Cooperative Learning

Following are forms that may be modified and used when students are working on assignments in teams in a course.

1. **Preliminary questionnaire (p. 2)**

   Administer and collect on Day 1 of the course. Form teams based on ability heterogeneity, common blocks of time to meet outside class, not allowing members of at-risk minority populations to be isolated in a group early in the curriculum when they are most likely to drop out, and (optional) common interests.

2. **Team policies and expectations (p. 3)**

   Hand this (or your own version) out on Day 1 and go over it in class.

3. **Team expectations assignment (p. 4)**

   Have teams fill out this form, sign it, and hand it in during the first week. Hand it back to them after 3-4 weeks to remind them of the rules they had agreed on.

4. **Peer autorating forms (pp. 5-7)**

   Give the first form to students on Day 1. Tell them that they will be completing the form for each of their teammates and themselves at the end of the semester or when the project is complete, and the ratings will be used to make individual adjustments to their team grade. Briefly go through the form with them. When the team has worked together for at least a month, have them fill the forms out and exchange and discuss them with one another. Tell students to fill one out for each of their teammates and share them with one another. You don't see these—they're mainly to give students who haven't been pulling their weight a warning that unless they get it together their grade on the assignments will be hurt. When ratings that count are later collected, low ones will not come as a surprise to anyone who got them in this practice round and didn't change his or her behavior.

   Hand the second form out at the end of the semester and/or when the project is complete and/or at mid-semester and/or after every assignment. Students fill them out confidentially and turn them in to you. You convert the verbal ratings to numbers and use a spreadsheet to determine individual weighting factors for the team project grade or the average of the grades for the period in question, following the procedure outlined on the third form.

5. **Cooperative learning checklists (pp. 8–10)**

   Checklists are provided to help you select appropriate implementation techniques for cooperative learning in homework groups, design projects/major presentations, and laboratory courses.

6. **Resources on cooperative learning (pp. 11–12).**

   Books, articles, and Web sites for practical suggestions and the research base that supports them.

PRELIMINARY QUESTIONNAIRE*

Name (Last, First) _____ Nickname _____

Section _____ Instructor _____

Main interests/hobbies: _____

Gender: ____ Female ____ Male

Ethnicity: ____ African-American ___ Asian-American ___ Hispanic

____ International ___ Native American ___ Other (specify) _____

Grades in prerequisite courses: CH 107 ____ MA 241 ____ PY 205 ____

Times unavailable for group work. In the spaces below, please cross out the times when you will *not* be available to work outside class on assignments with your group. Mark only genuine conflicts, such as with classes or job responsibilities.

Time	M	T	W	H	F	Sat	Sun
8–9 a.m.							
9–10							
10–11							
11–12							
12–1 p.m.							
1–2							
2–3							
3–4							
4–5							
5–6							
6–7							
7–8							
8–9							
9–10							
10–?							

* We would be grateful if you answer every question, but if for any reason you wish to skip those on gender, ethnicity, and interests you may do so.

Team Policies and Expectations

Your team will have a number of responsibilities as it completes problem and project assignments.

- *Designate a coordinator, recorder and checker for each assignment*. Rotate these roles for every assignment.
- *Agree on a common meeting time and what each member should have done before the meeting* (readings, taking the first cut at some or all of the assigned work, etc.)
- *Do the required individual preparation.*
- *Coordinator checks with other team members before the meeting to remind them of when and where they will meet and what they are supposed to do*.
- *Meet and work.* **Coordinator** keeps everyone on task and makes sure everyone is involved, **recorder** prepares final solution to be turned in, **monitor** checks to makes sure everyone understands both the solution and the strategy used to get it, and **checker** double-checks it before it is handed in. Agree on next meeting time and roles for next assignment. For teams of three, the same person should cover the monitor and checker roles.
- *Checker turns in the assignment, with the names on it of every team member who participated actively in completing it.* If the checker anticipates a problem getting to class on time on the due date of the assignment, it is his/her responsibility to make sure *someone* turns it in.
- *Review returned assignments*. Make sure everyone understands why points were lost and how to correct errors.
- *Consult with your instructor if a conflict arises that can't be worked through by the team*.
- **If a team member refuses to cooperate on an assignment, his/her name should not be included on the completed work**. If the non-cooperation continues, the team should meet with the instructor so that the problem can be resolved, if possible. If no resolution is achieved, the cooperating team members may notify the uncooperative member in writing that he/she is in danger of being fired, sending a copy of the memo to the instructor. If there is no subsequent improvement, they should notify the individual in writing (copy to the instructor) that he/she is no longer with the team. The fired student should meet with his/her instructor to discuss options. Similarly, students who are consistently doing all the work for their team may issue a warning memo that they will quit unless they start getting cooperation, and a second memo quitting the team if the cooperation is not forthcoming. Students who get fired or quit must find a team of 3 willing to accept them as a member, otherwise they get zeroes for the remaining assignments.

As you will find out, group work isn't always easy—team members sometimes cannot prepare for or attend group sessions because of other responsibilities, and conflicts often result from differing skill levels and work ethics. When teams work and communicate well, however, the benefits more than compensate for the difficulties. One way to improve the chances that a team will work well is to agree beforehand on what everyone on the team expects from everyone else. Reaching this agreement is the goal of the assignment on the last page of this handout.

Team Expectations Assignment

On a single sheet of paper, put your names and list the rules and expectations you agree as a team to adopt. You can deal with any or all aspects of the responsibilities outlined above—preparation for and attendance at group meetings, making sure everyone understands all the solutions, communicating frankly but with respect when conflicts arise, etc. Each team member should sign the sheet, indicating acceptance of these expectations and intention to fulfill them.

These expectations are for your use and benefit—we won't grade them or even comment on them unless you ask us to. Note, however, that if you make the list fairly thorough without being unrealistic you'll be giving yourselves the best chance. For example, "We will each solve every problem in every assignment completely before we get together" or "We will get 100 on every assignment" or "We will never miss a meeting" are probably unrealistic, but "We will try to set up the problems individually before meeting" and "We will make sure that anyone who misses a meeting for good cause gets caught up on the work" are realistic.

Team Member Evaluation Form*

The following evaluation of your team members is a tool to help improve your experience with group work. Its purpose is to determine those who have been active and cooperative members as well as to identify those who did not participate. Be consistent when evaluating each group member's performance by using the guidelines given below.

1 – never	**2 – rarely**	**3 – sometimes**	**4 – usually**	**5 – always**

Name of student being evaluated: _____

Circle your responses.

Has the student attended your group meetings?	1	2	3	4	5
Has the student notified a teammate if he/she would not be able to attend a meeting or fulfill a responsibility?	1	2	3	4	5
Has the student made a serious effort at assigned work before the group meetings?	1	2	3	4	5
Does the student attempt to make contributions in group meetings when he/she can?	1	2	3	4	5
Does the student cooperate with the group effort?	1	2	3	4	5

Overall rating on the following scale: _____ (Insert one of the given words.)

Excellent	Consistently went above and beyond—tutored teammates, carried more than his/her fair share of the load
Very good	Consistently did what he/she was supposed to do, very well prepared and cooperative
Satisfactory	Usually did what he/she was supposed to do, acceptably prepared and cooperative
Ordinary	Often did what he/she was supposed to do, minimally prepared and cooperative
Marginal	Sometimes failed to show up or complete assignments, rarely prepared
Deficient	Often failed to show up or complete assignments, rarely prepared
Unsatisfactory	Consistently failed to show up or complete assignments, unprepared
Superficial	Practically no participation
No show	No participation at all

*Adapted from a form in *Cooperative Learning and College Teaching*, reprinted in B.J. Millis and P.G. Cottell, Jr., *Cooperative Learning for Higher Education Faculty*, Oryx Press, Phoenix, 1998. Each student fills out one form for each team member after the team has worked together for several weeks. Instructor does not see these forms.

Peer Rating of Team Members*

Name_____ **Group #**_____

Please write the names of all of your team members, INCLUDING YOURSELF, and rate the degree to which each member fulfilled his/her responsibilities in completing the homework assignments. The possible ratings are as follows:

Excellent	Consistently went above and beyond—tutored teammates, carried more than his/her fair share of the load
Very good	Consistently did what he/she was supposed to do, very well prepared and cooperative
Satisfactory	Usually did what he/she was supposed to do, acceptably prepared and cooperative
Ordinary	Often did what he/she was supposed to do, minimally prepared and cooperative
Marginal	Sometimes failed to show up or complete assignments, rarely prepared
Deficient	Often failed to show up or complete assignments, rarely prepared
Unsatisfactory	Consistently failed to show up or complete assignments, unprepared
Superficial	Practically no participation
No show	No participation at all

These ratings should reflect each individual's level of participation and effort and sense of responsibility, not his or her academic ability.

Name of team member	**Rating**	**Reason for Rating < Satisfactory**
_____	_____	_____
		_____
_____	_____	_____
		_____
_____	_____	_____
		_____
_____	_____	_____
		_____

Your signature: _____

* R.M. Felder, 2004. Each student fills out this form, instructor collects and uses to adjust team project grades for individual team members using procedure on following page.

Autorating System*

1. Determine group project or average homework grade.

2. Convert individual verbal ratings to numbers:

Excellent = 100
Very good = 87.5
Satisfactory = 75
Ordinary = 62.5
Marginal = 50
Deficient = 37.5
Unsatisfactory = 25
Superficial = 12.5
No show = 0

3. On a spreadsheet, enter numerical ratings received by team members in rows. In the "Vote 1" column are the votes given by Betty to herself, Carlos, John, and Angela; under "Vote 2" are all of the votes given by Carlos, etc.

4. Average individual marks, calculate overall team average, calculate adjustment factors as individual average divided by team average. **Impose an upper limit of 1.05 on any individual student's adjustment factor.** Doing so avoids raising grades of teammates of students with very low ratings by more than half a letter grade.

5. Individual project grade = (team grade) x (adjustment factor). **The instructor reserves the right to disregard anomalous ratings.**

Example

Team project grade	**80**							**Indiv. Proj. Grade**
Name	Vote 1	Vote 2	Vote 3	Vote 4	Indiv. Avg.	Team Avg.	Adj. Fctr.	
Betty	87.5	87.5	75	87.5	84.4	82.0	1.02	82
Carlos	87.5	100	87.5	87.5	90.6	82.0	1.05	84
John	62.5	75	50	75	65.6	82.0	0.80	64
Angela	87.5	87.5	87.5	87.5	87.5	82.0	1.05	84

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*This sheet is for instructor use and is not handed out to students. Adapted from Brown, R. W. (1995). *Autorating: Getting individual marks from team marks and enhancing teamwork. 1995 Frontiers in Education Conference Proceedings*, Paper 3C24. For a complete reprint, contact Rob Brown at *rwb@rmit.edu.au*.

To read about research done on the effectiveness of this instrument, see

Kaufman, D. B., Felder, R. M., & Fuller, H. (2000). Accounting for individual effort in cooperative learning teams. *Journal of Engineering Education, 89* (2), 133–140.
<http://www.ncsu.edu/felder-public/Papers/Kaufmanpap.pdf>

Checklists for Cooperative Learning Implementation

CL Checklist for Homework Assignments

___ Setting policies: Include all policies and procedures for homework groups in the material you pass out on Day 1. Include any peer rating form you plan to use.

___ Group formation: Groups should be teacher-assigned and have 3-4 members with a mixture of ability levels and common blocks of time to meet outside class. Early in the curriculum, don't let members of at-risk minorities be isolated in a team. (Use the form on p. 2 to get the required information.)

___ First Assignment: As part of the first assignment, have teams write a list of expectations they have for each other (e.g. come to meetings prepared and on time, do what you're supposed to do, let the others know if you won't be able to fulfill a responsibility, etc.) and sign them. (Use the form on p. 4.)

___ Regular Assignments: Team roles (coordinator, recorder, checker, monitor) should rotate with each assignment, with no one repeating a role until everyone in the group has had a turn at each one. In 3-person groups, combine the roles of checker and monitor. Consider requiring students to complete and turn in individual outlines of solutions to promote accountability and avoid a situation in which the same student begins every problem solution. Instruct teams to omit names of non-participants when turning in assignments.

___ Bonus: Consider offering a bonus (3-5 points) on tests to members of groups in which the team test average is above (say) 80%.

___ Team self-assessment: Every few weeks, include in assignments questions for self-assessment of group functioning. (What are we doing well as a team? What do we need to improve? What, if anything, will we do differently from now on?). Teams may also evaluate themselves on how well they are meeting the expectations they set in the first assignment.

___ Peer ratings: At the beginning of the semester, hand out and explain any peer rating form you plan to use (e.g., the one on p. 5 or p. 8), stating that you will be using their ratings to adjust the team homework grade for individual performance. At mid-semester, have students submit their ratings and use the results to adjust the average homework grades for the first half of the semester. Another option is to share the results with students so that they can make changes in their team performance, but don't use them to adjust grades. Repeat at the end of the semester to adjust the second-half homework grades.

___ Firing and quitting: Provide last resort options of firing and quitting. Be sure to describe the required procedures in the material you hand out on the first day. (See form on p. 3.)

CL Checklist for Design Projects/Major Presentations

___ Setting policies. Include all policies and procedures for project teams (p. 3) in the material you pass out on Day 1. Include any peer rating form you plan to use (p. 5 or p. 8).

__ Group formation: Groups should be teacher-assigned and have 3-4 members with a mixture of ability levels and common blocks of time to meet outside class. Early in the curriculum, don't let members of at-risk minorities be isolated in a team. (Use the form on p. 2 to get the required information.)

___ First Assignment: Shortly after they are formed, have teams write a list of expectations they have for each other (e.g. come to meetings prepared and on time, do what you're supposed to do, let the others know if you won't be able to fulfill a responsibility, etc.) and sign them. (Use the form on p. 4.)

___ Jigsaw: Use Jigsaw to provide specialized expertise within each group. Designate each team member as the "expert" in one aspect of the project and provide specialized training to all the experts in each aspect.

___ Set milestones: Consider breaking the project into intermediate steps with parts turned in throughout the semester (preliminary plans and cost analysis, list of related literature, rough draft of final report, etc.). This practice helps teams distribute the work and reveals problems with individual members before the end of the semester when it may be too late to address them.

___ Team self-assessment: Every few weeks, include in assignments questions for self-assessment of group functioning. (What are we doing well as a team? What do we need to improve? What, if anything, will we do differently from now on?). Teams may also evaluate themselves on how well they are meeting the expectations they set in the first assignment.

___ Peer ratings: At the beginning of the semester, hand out and explain any peer rating form you plan to use (e.g., the one on p. 5 or p. 8), stating that you will be using their ratings to adjust the team project grade for individual performance. At mid-semester, have students submit their ratings and use the results to adjust the average project grades for the first half of the semester. Another option is to share the results with students so that they can make changes in their team performance, but don't use them to adjust grades. Repeat at the end of the semester to adjust the second-half project grades.

___ Random presenter selection: Have the presentation of the project divided into definable sections. The day before (or an hour before or five minutes before) the presentation, randomly assign a group member to present each part. Be sure to tell students early in the semester you will be doing this. Base the team's presentation grade on how well each part is presented.

___ Individual accountability: If the project is a major component of the course, give some individual assignments and an individual examination covering the entire project content. Count the results toward the course grade.

___ Firing and quitting: Provide last resort options of firing and quitting. Be sure to describe the procedures in the material you hand out on the first day. (See form on p. 3.)

CL Checklist for Laboratory Courses

___ Setting policies. Include all policies and procedures for project teams (p. 3) in the material you pass out on Day 1. Include any peer rating form you plan to use (p. 5 or p. 8).

___ Group formation: Groups should be teacher-assigned and have 3-4 members with a mixture of ability levels and common blocks of time to meet outside class. Early in the curriculum, don't let members of at-risk minorities be isolated in a team. (Use the form on p. 2 to get the required information.)

___ First Assignment: Shortly after they are formed, have teams write a list of expectations they have for each other (e.g. come to meetings prepared and on time, do what you're supposed to do, let the others know if you won't be able to fulfill a responsibility, etc.) and sign them. (Use the form on p. 4.)

___ Team roles: Define appropriate functional roles (coordinator, recorder, monitor, checker) and technical roles (data analyst, graphic artist, experimental designer, statistician, theoretical analyst…). Rotate the functional roles with each experiment.

___ Jigsaw: Use Jigsaw to provide specialized expertise within each group. Designate each team member as the "expert" in one aspect of the lab (e.g., experimental design, equipment calibration and operation, data analysis, theoretical interpretation,...) and provide specialized training to all the experts in each aspect.

___ Peer review: Have teams swap lab report drafts to provide peer reviewing and feedback. This step will improve the quality of the product you have to evaluate. Collect and mark the critiques to improve their quality in subsequent labs.

___ Team self-assessment: Every few weeks, include in assignments questions for self-assessment of group functioning. (What are we doing well as a team? What do we need to improve? What, if anything, will we do differently from now on?). Teams may also evaluate themselves on how well they are meeting the expectations they set in the first assignment.

___ Peer ratings: At the beginning of the semester, hand out and explain any peer rating form you plan to use (e.g., the one on p. 5 or p. 8), stating that you will be using their ratings to adjust the team lab grade for individual performance. At mid-semester, have students submit their ratings and use the results to adjust the average lab grades for the first half of the semester. Another option is to share the results with students so that they can make changes in their team performance, but don't use them to adjust grades. Repeat at the end of the semester to adjust the second-half lab grades.

___ Individual accountability: During the lab, circulate and ask individual students to report on what the team is doing. Give individual tests on the material covered in the lab report (experimental design, equipment calibration and operation, data analysis and interpretation,...)

___ Firing and quitting: Provide last resort options of firing and quitting. Be sure to describe the procedures in the material you hand out on the first day. (See form on p. 3.)

Resources on Cooperative Learning

To get an overview of CL:

1. Felder, R. M., & Brent, R. (1994). *Cooperative learning in technical courses: Procedures, pitfalls, and payoffs.* Report to the National Science Foundation. (ERIC Document Reproduction Service No. ED 377 038). *http://www.ncsu.edu/felder-public/Papers/Coopreport.html*
2. Millis, B. J. & Cottell, Jr., P. G. (1998). *Cooperative learning for higher education faculty.* Phoenix, AZ: Oryx Press.

To find practical suggestions for CL structures and troubleshooting:

3. Felder, R. M., & Brent, R. (1996). Navigating the bumpy road to student-centered instruction. *College Teaching, 44*(2), 43–47. *http://www.ncsu.edu/felder-public/Papers/Resist.html*.
4. Felder, R. M., & Brent, R. (2001). FAQs-3. Groupwork in distance learning. *Chemical Engineering Education, 35*(2), 102–103. *http://www.ncsu.edu/felder-public/Columns/FAQs-3.html*.
5. Felder, R. M., & Brent, R. (2001). Effective Strategies for Cooperative Learning. Journal of Cooperation and Collaboration in College Teaching, *10*(2), 69–75. *http://www.ncsu.edu/felder-public/Papers/CLStrategies(JCCCT).pdf*.
6. Felder, R.M., & Brent, R. (2003). Designing and Teaching Courses to Satisfy the ABET Engineering Criteria. *J. Engr. Education, 92*(1), 7–25. Appendix E of this paper demonstrates that Cooperative Learning can be used to address all of Outcomes 3a–3k. *http://www.ncsu.edu/felder-public/Papers/ABET_Paper_(JEE).pdf*.
7. Johnson, D. W., Johnson, R.T., & Smith, K. A. (1998). *Active learning: Cooperation in the college classroom* (2nd ed.). Edina. MN: Interaction Book Co.
8. Kaufman, D.B., Felder, R. M., & Fuller, H. (2000). Accounting for individual effort in cooperative learning teams. *Journal of Engineering Education, 89*(2), 133–140. *http://www.ncsu.edu/felder-public/Papers/Kaufmanpap.pdf*.
9. McKeachie, W. J. (2002). Teaching tips: Strategies, research, and theory for college and university teachers (11th ed.). Boston: Houghton Mifflin. (Chapter 15)
10. Oakley, B., Felder, R.M., Brent, R., & I. Elhajj, I. (2004). "Turning Student Groups into Effective Teams," *J. Student Centered Learning, 2*(1), 9–34. *http://www.ncsu.edu/felder-public/Papers/Oakley-paper(JSCL).pdf*.

To explore the research base for CL:

11. Johnson, D. W., Johnson, R. T., & Stanne, M.E. (2000). *Cooperative Learning Methods: A meta-analysis.* University of Minnesota, Minneapolis: Cooperative Learning Center. *http://www.co-operation.org/pages/cl-methods.html*.
12. Springer, L., Stanne, M. E., & Donovan, S. (1997). *Effects of small-group learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis.* Madison, WI: National Institute for Science Education. *http://www.wcer.wisc.edu/nise/CL1/CL/resource/R2.htm*.
13. Terenzini, P.T., Cabrera, A.F., Colbeck, C.L., Parente, J.M., & Bjorklund, S.A. (2001). Collaborative learning vs. lecture/discussion: Students' reported learning gains. *J. Engr. Education, 90*(1), 123–130.

To read about a longitudinal study of cooperative learning in engineering education:

14. Felder, R.M., Felder, G.N., & Dietz, E.J. (1998). A Longitudinal Study of Engineering Student Performance and Retention. V. Comparisons with Traditionally-Taught Students. *J. Engr. Education, 87*(4), 469–480. *http://www.ncsu.edu/felder-public/Papers/long5.html*.

15. Felder, R.M. (1995). A Longitudinal Study of Engineering Student Performance and Retention. IV. Instructional Methods and Student Responses to Them. *J. Engr. Education, 84*(4), 361–367. *http://www.ncsu.edu/felder-public/Papers/long4.html*.

16. Felder, R.M., Felder, G.N., Mauney, M., Hamrin, Jr., C.E., & Dietz, E.J. (1995). A Longitudinal Study of Engineering Student Performance and Retention. III. Gender Differences in Student Performance and Attitudes. *J. Engr. Education, 84*(2), 151–174. *http://www.ncsu.edu/felder-public/Papers/long3.pdf***.**

For on-line information on CL:

17. *Active/Cooperative Learning: Best Practices in Engineering Education.* A collection of resources compiled by the Foundation Coalition, including excerpts from videotaped interviews with some of the leading practitioners of CL in engineering education on different aspects of planning and implementation. *http://clte.asu.edu/active/main.htm***.**

18. *Engineering Team Training Workbook.* This workbook of team exercises was developed at Arizona State University. *http://www.eas.asu.edu/~asufc/teaminginfo/teams.html***.**

19. *IASCE.* The web site of the International Association for the Study of Cooperation in Education. A collection of resources including a newsletter, list of related organizations and links, and a search engine. *http://www.iasce.net/*.

20. *Innovations in SMET Education.* The web site of the National Institute for Science Education at the University of Wisconsin. Resources on collaborative learning (including Cooper and Robinson's outstanding annotated bibliography on cooperative learning), learning through technology, and assessment of learning**.** *http://www.wcer.wisc.edu/nise/CL1/*.

21. *Online Collaborative Learning in Higher Education.* An excellent resource for articles and links maintained by the Central Queensland University. *http://clp.cqu.edu.au/***.**

22. *TEAMWORKS.* The Virtual Team Assistant. Modules on various aspects of team functioning including team building, project management, problem solving, conflict management, feedback, leadership, oral and written presentations, and (for instructors) teaching with teams. Compiled by Barbara O'Keefe of the University of Illinois. *http://www.vta.spcomm.uiuc.edu/*.

23. *Ted Panitz's home page.* A vast collection of resources on cooperative learning including an e-book, articles, faculty surveys, examples, and links to many other sites, compiled by Ted Panitz of Cape Cod Community College. *http://home.capecod.net/~tpanitz*.

24. *The University of Minnesota Cooperative Learning Center*. Information and references on different aspects of cooperative learning, including "Cooperative Learning Methods: A Meta-Analysis," which summarizes the results of a large number of CL research studies. The site is maintained by David and Roger Johnson of the University of Minnesota. *http://www.co-operation.org/*.