Design and Implementation of Cooperative Learning

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Workshop Layout

• Welcome and Overview
• Reflection on Seminar
• Formal Cooperative Learning Rationale and Principles
• Formal Cooperative Learning Strategies
  – Cooperative Problem-Based Learning
  – Cooperative Jigsaw
  – Cooperative Project-Based Learning
• Aligning outcomes, assessment, and instruction
• Design and Implementation
Overall Goal

• Build your repertoire of cooperative learning strategies as well as skills and confidence for implementing them
Workshop Objectives

• Participants will be able to:
  – Describe key features of cooperative learning and effective, interactive strategies for facilitating learning
  – Build on key elements of Course Design Foundations
    • How People Learn (HPL)
    • Understanding by Design (UbD) process – Content (outcomes) – Assessment – Pedagogy
  – Explain key features of and rationale for Cooperative Learning
  – Identify connections between cooperative learning and desired outcomes of courses and programs
• Participants will begin applying key elements to the design on a course, class session or learning module
Cooperative Learning is instruction that involves people working in teams to accomplish a common goal, under conditions that involve both positive interdependence (all members must cooperate to complete the task) and individual and group accountability (each member is accountable for the complete final outcome).

Key Concepts

• Positive Interdependence
• Individual and Group Accountability
• Face-to-Face Promotive Interaction
• Teamwork Skills
• Group Processing

http://www.ce.umn.edu/~smith/docs/Smith-CL%20Handout%202008.pdf
Active Learning: Cooperation in the College Classroom

• **Informal** Cooperative Learning Groups
• **Formal** Cooperative Learning Groups
• Cooperative **Base** Groups

Notes: Cooperative Learning Handout (CL College-912.doc)

www.ce.umn.edu/~smith/docs/CL%20College-912.doc
Book Ends on a Class Session

Book Ends on a Class Session

1. Advance Organizer
2. Formulate-Share-Listen-Create (Turn-to-your-neighbor) -- repeated every 10-12 minutes
3. Session Summary (Minute Paper)
   1. What was the most useful or meaningful thing you learned during this session?
   2. What question(s) remain uppermost in your mind as we end this session?
   3. What was the “muddiest” point in this session?
Strategies for Energizing Large Classes: From Small Groups to Learning Communities:

Jean MacGregor, James Cooper, Karl Smith, Pamela Robinson

New Directions for Teaching and Learning, No. 81, 2000. Jossey-Bass
**Informal Cooperative Learning Planning Form**

**Description of the Lecture**

1. Lecture Topic: ____________________________

2. Objectives (Major Understandings Students Need To Have At The End Of The Lecture):
   a. ____________________________
   b. ____________________________

3. Time Needed: ____________________________

4. Method For Assigning Students To Pairs Or Triads: __________

5. Method Of Changing Partners Quickly: ____________________________

6. Materials (such as transparencies listing the questions to be discussed and describing the formulate, share, listen, create procedure):
   ____________________________

**Advanced Organizer Question(s)**

Questions should be aimed at promoting advance organizing of what the students know about the topic to be presented and establishing expectations as to what the lecture will cover.

1. ____________________________
2. ____________________________
3. ____________________________

**Cognitive Rehearsal Questions**

List the specific questions to be asked every 10 or 15 minutes to ensure that participants understand and process the information being presented. Instruct students to use the formulate, share, listen, create procedure.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________

Monitor by systematically observing each pair. Intervene when it is necessary. Collect data for whole class processing. Students’ explanations to each other provide a window into their minds that allows you to see what they do and do not understand. Monitoring also provides an opportunity for you to get to know your students better.

**Summary Question(s)**

Give an ending discussion task and require students to come to consensus, write down the pair or triad’s answer(s), sign the paper, and hand it in. Signatures indicate that students agree with the answer, can explain it, and guarantee that their partner(s) can explain it. The questions could (a) ask for a summary, elaboration, or extension of the material presented or (b) pique the next class session.

1. ____________________________
2. ____________________________

**Celebrate Students’ Hard Work**

1. ____________________________
2. ____________________________
Informal Cooperative Learning

Farewell, Lecture?

Eric Mazur

Discussions of education are generally predicated on the assumption that we know what education is. I hope to convince you otherwise by recounting some of my own experiences. When I started teaching introductory physics to undergraduates at Harvard University, I never asked myself how I would educate my students. I did what my teachers had done—l lectured. I thought that was how one learned. Look around anywhere in the world and you'll find lecture halls filled with students and, at the front, an instructor. This approach to education has not changed since before the Renaissance and the birth of scientific inquiry. Early in my career I received the first hints that something was wrong with teaching in this manner, but I had ignored it. Sometimes it's hard to face reality. When I started teaching, I prepared lecture notes and then taught from them. Because my lectures deviated from the textbook, I provided students with copies of these lecture notes. The infuriating result was that on my end-of-semester evaluations—which were quite good otherwise—a number of students complained that I was "lecturing straight from (his) lecture notes." What was I supposed to do? Develop a set of lecture notes different from the ones I handed out? I decided to ignore the students' complaints.

A few years later, I discovered that the students were right. My lecturing was ineffective, despite the high evaluations. Early on in the physics curriculum—in week 2 of a typical introductory physics course—the Laws of Newton are presented. Every student in such a course can recite Newton's third law of motion, which states that the force of object A on object B in an interaction between two objects is equal in magnitude to the force of B on A—it sometimes is known as "action is reaction." One day, when the course had progressed to more complicated material, I decided to test my students' understanding of this concept by not doing traditional problems, but by asking them a set of basic conceptual questions (1,2). One of the questions, for example, requires students to compare the forces that a heavy truck and a light car exert on one another when they collide. I expected that the students would have no trouble tackling such questions, but much to my surprise, hardly a minute after the last question, one student asked, "How should I answer these questions?" According to what you taught me or according to the way I usually think about these things?" To my dismay, students had great difficulty with the conceptual questions. That was when it began to dawn on me that something was amiss.

In hindsight, the reason for my students' poor performance is simple. The traditional approach to teaching reduces education to a transfer of information. Before the industrial revolution, when books were not yet mass commodities, the lecture method was the only way to transfer information from one generation to the next. However, education is so...
Informal CL (Book Ends on a Class Session) with Concept Tests

Physics
Peer Instruction
    Peer Instruction – www.prenhall.com
Richard Hake – http://www.physics.indiana.edu/~hake/

Chemistry
Chemistry ConcepTests - UW Madison
www.chem.wisc.edu/~concept
Video: Making Lectures Interactive with ConcepTests
    ModularChem Consortium – http://mc2.cchem.berkeley.edu/

STEMTEC

Harvard – Derek Bok Center
Conceptual Understanding

http://groups.physics.umn.edu/physed/Research/MNModel/FCI.html
Physics (Mechanics) Concepts: The Force Concept Inventory (FCI)

• A 30 item multiple choice test to probe student's understanding of basic concepts in mechanics.
• The choice of topics is based on careful thought about what the fundamental issues and concepts are in Newtonian dynamics.
• Uses common speech rather than cueing specific physics principles.
• The distractors (wrong answers) are based on students' common inferences.
Workshop Biology

Traditional passive lecture vs. “Workshop biology”

Source: Udovic et al. 2002
**Biology**

Figure 3. Comparison of normalized learning gains (% of possible maximum) in 10% increments on 12 common pretest and posttest questions for students in one traditional (F'03) and two interactive (S'04, S'05) classes. Normalized learning gains were computed as in Figure 2.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>F'03</th>
<th>S'04</th>
<th>S'05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest (12 questions)</td>
<td>34</td>
<td>31</td>
<td>37</td>
</tr>
<tr>
<td>Posttest (12 questions)</td>
<td>65</td>
<td>74</td>
<td>72</td>
</tr>
<tr>
<td>Raw learning gain</td>
<td>31</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>Normalized learning gain</td>
<td>46</td>
<td>62</td>
<td>61</td>
</tr>
<tr>
<td>Hourly exams</td>
<td>71</td>
<td>71</td>
<td>73</td>
</tr>
<tr>
<td>Final exam</td>
<td>77</td>
<td>71</td>
<td>76</td>
</tr>
<tr>
<td>Problem sets</td>
<td>82</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>Participation</td>
<td>N/A</td>
<td>86</td>
<td>81</td>
</tr>
<tr>
<td>Final total points</td>
<td>76</td>
<td>81</td>
<td>81</td>
</tr>
</tbody>
</table>

*Data based only on the 12 questions that were common to all three pretests and posttests (see Appendix A). Average for each class is shown. Normalized learning gains were computed as described in the text and the legend to Figure 2.*

Active Learning: Cooperation in the College Classroom

- **Informal** Cooperative Learning Groups
- **Formal** Cooperative Learning Groups
- Cooperative **Base** Groups

See Cooperative Learning Handout (CL College-912.doc)
Formal Cooperative Learning
Task Groups
Design team failure is usually due to failed team dynamics (Leifer, Koseff & Lenshow, 1995).

It’s the soft stuff that’s hard, the hard stuff is easy (Doug Wilde, quoted in Leifer, 1997)

Most Important Skills Employers Look For In New Hires

Which TWO of the following skills or abilities are most important to you?

- Teamwork skills: 44%
- Critical thinking/reasoning: 33%
- Oral/written communication: 30%
- Ability to assemble/organize information: 21%
- Innovative/thinking creatively: 20%
- Able to work with numbers/statistics: 9%
- Foreign language proficiency: 3%

* Skills/abilities recent graduates think are the two most important to employers

Top Three Main Engineering Work Activities

**Engineering Total**
- Design – 36%
- Computer applications – 31%
- Management – 29%

**Civil/Architectural**
- Management – 45%
- Design – 39%
- Computer applications – 20%

Characteristics of Effective Teams?

• ?
• ?
A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable.

- SMALL NUMBER
- COMPLEMENTARY SKILLS
- COMMON PURPOSE & PERFORMANCE GOALS
- COMMON APPROACH
- MUTUAL ACCOUNTABILITY

Teamwork Skills

• Communication
• Listening and Persuading
• Decision Making
• Conflict Management
• Leadership
• Trust and Loyalty
Professor's Role in Formal Cooperative Learning

1. Specifying Objectives

2. Making Decisions

3. Explaining Task, Positive Interdependence, and Individual Accountability

4. Monitoring and Intervening to Teach Skills

5. Evaluating Students' Achievement and Group Effectiveness
Decisions, Decisions

Group size?
Group selection?
Group member roles?
How long to leave groups together?
Arranging the room?
Providing materials?
Time allocation?
Personal Response System

• Socrative.com (Socrative Student)
• My room 678635
Optimal Group Size?

A. 2
B. 3
C. 4
D. 5
E. 6
Formal Cooperative Learning Task Groups

Group Selection?

A. Self selection
B. Random selection
C. Stratified random
D. Instructor assign
E. Interest
Formal Cooperative Learning – Types of Tasks

1. **Jigsaw** – Learning new conceptual/procedural material

2. **Peer Composition or Editing**

3. **Reading Comprehension/Interpretation**

4. **Problem Solving, Project, or Presentation**

5. **Review/Correct Homework**

6. **Constructive Controversy**

7. **Group Tests**
Cooperative Jigsaw

Jigsaw Classroom

Welcome to the official web site of the jigsaw classroom, a cooperative learning technique that reduces racial conflict among school children, promotes better learning, improves student motivation, and increases enjoyment of the learning experience. The jigsaw technique was first developed in the early 1970s by Elliot Aronson and his students at the University of Texas and the University of California. Since then, hundreds of schools have used the jigsaw classroom with great success. The jigsaw approach is considered to be a particularly valuable tool in averting tragic events such as the Columbine massacre.

Explore the Jigsaw Classroom:
- Overview of the Technique
- History of the Jigsaw Classroom
- Jigsaw in 10 Easy Steps
- Tips on Implementation
- Books and Articles Related to the Jigsaw Technique
- Chapter 1 of Aronson's Book "Nobody Left to Hate: Teaching Compassion After Columbine"
- Links on Cooperative Learning and School Violence
- About Elliot Aronson and This Web Site

Jigsaw Schedule

COOPERATIVE GROUPS (3-4 members)

PREPARATION PAIRS

CONSULTING/SHARING PAIRS

TEACHING/LEARNING IN COOPERATIVE GROUPS

WHOLE CLASS REVIEW

www.jigsaw.org/
Challenge-Based Learning

- Problem-based learning
- Case-based learning
- Project-based learning
- Learning by design
- Inquiry learning
- Anchored instruction

John Bransford, Nancy Vye and Helen Bateman. Creating High-Quality Learning Environments: Guidelines from Research on How People Learn
Challenge-Based Instruction Cycle

The Challenges

Go Public

Generate Ideas

Test Your Mettle

Multiple Perspectives

Research & Revise

Legacy Cycle

https://repo.vanth.org/portal/public-content/star-legacy-cycle/star-legacy-cycle
Problem-Based Learning

- Problem posed
- Identify what we need to know
- Learn it
- Apply it

START
Problem-Based Cooperative Learning

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Estimation Exercise
First Course Design Experience
UMN – Institute of Technology

• Thinking Like an Engineer
• Problem Identification
• Problem Formulation
• Problem Representation
• Problem Solving

Problem-Based Learning
*Based on First Year Engineering course – Problem-based cooperative learning How to Model It published in 1990.
Problem Based Cooperative Learning Format

TASK: Solve the problem(s) or Complete the project.

INDIVIDUAL: Estimate answer. Note strategy.

COOPERATIVE: One set of answers from the group, strive for agreement, make sure everyone is able to explain the strategies used to solve each problem.

EXPECTED CRITERIA FOR SUCCESS: Everyone must be able to explain the strategies used to solve each problem.

EVALUATION: Best answer within available resources or constraints.

INDIVIDUAL ACCOUNTABILITY: One member from your group may be randomly chosen to explain (a) the answer and (b) how to solve each problem.

EXPECTED BEHAVIORS: Active participating, checking, encouraging, and elaborating by all members.

INTERGROUP COOPERATION: Whenever it is helpful, check procedures, answers, and strategies with another group.
At M.I.T., Large Lectures Are Going the Way of the Blackboard

By SARA RIMER
Published: January 12, 2009

CAMBRIDGE, Mass. — For as long as anyone can remember, introductory physics at the Massachusetts Institute of Technology was taught in a vast windowless amphitheater known by its number,
http://web.mit.edu/edtech/casestudies/teal.html#video
The primary goal of the Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) Project is to establish a highly collaborative, hands-on, computer-rich, interactive learning environment for large-enrollment courses.

Educational research indicates that students should collaborate on interesting topics and be deeply involved with the material they are studying. We promote active learning in a redesigned classroom of 180 students or more. (Of course, smaller classes can also benefit.) We believe the SCALE-UP Project has the potential to radically change the way large classes are taught at colleges and universities. The social interactions between students and their teachers appear to be the "active ingredients" that make the approach work. As more and more instruction is handled virtually via technology, the relationship-building capability of brick and mortar institutions becomes even more important. The pedagogical methods and classroom management techniques we design and disseminate are general enough to be used in a wide variety of classes at many different types of colleges.

Class time is spent primarily on "unscripted" and "uncontrollable". Essentially these are hands-on activities, simulations, or interesting questions and problems. There are also some hypothesis-driven labs where students have to write detailed reports. (The "example" is more sophisticated than most, but shows what the best students are capable of doing.) Students sit in three groups of three students at 6 or 7 foot diameter round tables. Instructors circulate and work with teams and individuals, engaging them in Socratic-like dialogues. Each table has at least three networked laptops. The setting is very much like a banquet hall, with lively interactions nearly all the time. Many other colleges and universities are adopting/adapting the SCALE-UP room design and pedagogy. Engineering schools are especially pleased with the course objectives, which fit in well with the requirements for ABET accreditation.

Materials developed for the course were incorporated into what became the leading introductory physics textbook, used by more than 1/3 of all science, math, and engineering students in the country.

Impact

Rigorous evaluations of learning have been conducted in parallel with the curriculum development effort. Besides hundreds of hours of classroom video and audio recordings, we also have conducted numerous interviews and focus groups, conducted many conceptual learning assessments (using nationally-recognized instruments in a pretest/posttest protocol), and collected portfolios of student work. We have data comparing nearly 16,000 traditional and SCALE-UP students. Our findings can be summarized as follows:

- Ability to solve problems is improved
- Conceptual understanding is increased
- Attitudes are improved
- Failure rates are drastically reduced, especially for women and minorities
- "At risk" students do better in later engineering statics classes

Details

A chapter describing the approach and its underpinnings is available. A shorter description is posted on the FYAL website, or you can view an article describing the project from the proceedings of the Sigma Xi Forum on Reforming Undergraduate Education. The Raleigh News & Observer newspaper also has a description of the project. The very successful pilot project was described in the first issue of the Physics Education Research Supplement to Am. J. of Physics. See our publication page for more information.

More than 50 colleges and universities across the US have adapted the SCALE-UP approach to their own institutions. In all cases, the basic idea remains the same: get the students working together to examine something interesting. That frees the instructor to roam about the room, asking questions and stirring up debate. Classes in physics, chemistry, math, engineering, and even literature have been taught this way. If you want more information, please contact Dr. Robert Bringewatt.

http://www.ncsu.edu/PER/scaleup.html
http://tile.uiowa.edu/
The ribbon cutting for the new STSS building featured, from left to right: student veteran Chris Hellebrock, U of M President Robert Bruinsma, Regents Linda Cohen, building architect and U alumnus Bill Pederson, College of Biological Sciences dean Joline Wright, Provost Tom Sullivan, and Minnesota Student Association president Sarah Shocks.

In addition to the STSS being designed to meet or exceed the requirements of Minnesota’s stringent 63 sustainable design code and seeks LEED Gold certification. Sustainable
Inside an Active Learning Classroom

- STSS at the University of Minnesota

http://vimeo.com/andyub/activeclassroom

“I love this space! It makes me feel appreciated as a student, and I feel intellectually invigorated when I work and learn in it.”
The Motivation to Learn Begins with a Problem

In a problem-based learning (PBL) model, students engage complex, challenging problems and collaboratively work toward their resolution. PBL is about students connecting disciplinary knowledge to real-world problems—the motivation to solve a problem becomes the motivation to learn.

PBL@UD

For more than ten years, the Leaders and Fellows of the Institute for Transforming Undergraduate Education (ITUE) have encouraged the adoption of student-centered and active classroom pedagogies—and in particular—the use of PBL in the undergraduate classroom. On- and off-campus workshops are held for faculty and students to enhance their understanding of PBL.

Recipient of a Hesburgh Certificate of Excellence

The Theodore M. Hesburgh Award was created to acknowledge and reward successful, innovative faculty development programs that enhance undergraduate teaching. ITUE is a recipient of the Hesburgh Certificate of Excellence for its work in implementing problem-based learning in the classroom.

What we offer

PBL Training at a lower cost:
Attend our January 4-6 Workshop for an Introduction to PBL!

This workshop will demonstrate problem-based learning (PBL) and model ways that PBL can be used effectively in all disciplines. We will begin with a problem, and participants will work in teams to experience first-hand what this instructional approach entails. We will then move to the main focus of this program: writing effective problem-based materials. Participants will leave the session with new or revised problems for use in their courses.

http://www.udel.edu/inst/
Project-Based Cooperative Learning

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Design-Build Project
Active Learning: Cooperation in the College Classroom

- **Informal** Cooperative Learning Groups
- **Formal** Cooperative Learning Groups
- Cooperative **Base** Groups

See Cooperative Learning Handout (CL College-912.doc)
Cooperative Base Groups

- Are Heterogeneous
- Are Long Term (at least one quarter or semester)
- Are Small (3-5 members)
- Are for support
- May meet at the beginning of each session or may meet between sessions
- Review for quizzes, tests, etc. together
- Share resources, references, etc. for individual projects
- Provide a means for covering for absentees
Does Psychological Safety Hinder Performance?

Psychological safety does not operate at the expense of employee accountability; the most effective organizations achieve high levels of both, as this matrix shows.

<table>
<thead>
<tr>
<th>Psychological Safety</th>
<th>Accountability for Meeting Demanding Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>Comfort zone</td>
</tr>
<tr>
<td></td>
<td>Employees really enjoy working with one another but don’t feel particularly challenged. Nor do they work very hard. Some family businesses and small consultancies fall into this quadrant.</td>
</tr>
<tr>
<td>HIGH</td>
<td>Learning zone</td>
</tr>
<tr>
<td></td>
<td>Here the focus is on collaboration and learning in the service of high-performance outcomes. The hospitals described in this article fall into this quadrant.</td>
</tr>
<tr>
<td>LOW</td>
<td>Apathy zone</td>
</tr>
<tr>
<td></td>
<td>Employees tend to be apathetic and spend their time jockeying for position. Typical organizations in this quadrant are large, top-heavy bureaucracies, where people fulfill their functions but the preferred modus operandi is to curry favor rather than to share ideas.</td>
</tr>
<tr>
<td>HIGH</td>
<td>Anxiety zone</td>
</tr>
<tr>
<td></td>
<td>Such firms are breeding grounds for anxiety. People fear to offer tentative ideas, try new things, or ask colleagues for help, even though they know great work requires all three. Some investment banks and high-powered consultancies fall into this quadrant.</td>
</tr>
</tbody>
</table>
Designing and Implementing Cooperative Learning

• Think like a designer
• Ground practice in robust theoretical framework
• Start small, start early and iterate
• Celebrate the successes; problem-solve the failures
The Instructor’s Role in Cooperative Learning

Make Pre-Instructional Decisions

Specify Academic and Teamwork Skills Objectives: Every lesson has both (a) academic and (b) interpersonal and small group (teamwork) skills objectives.

Decide on Group Size: Learning groups should be small (groups of two or three members, four at the most).

Decide on Group Composition (Assign Students to Groups): Assign students to groups randomly or select groups yourself. Usually you will wish to maximize the heterogeneity in each group.

Assign Roles: Structure student-student interaction by assigning roles such as Reader, Recorder, Encourager of Participation, and Checker for Understanding.

Arrange the Room: Group members should be “knee to knee and eye to eye” but arranged so they all can see the instructor at the front of the room.

Plan Materials: Arrange materials to give a “sink or swim together” message. Give only one paper to the group or give each member part of the material to be learned.

Explain Task and Cooperative Structure

Explain the Academic Task: Explain the task, the objectives of the lesson, the concepts and principles students need to know to complete the assignment and the procedures they are to follow.

Explain the Criteria for Success: Student work should be evaluated on a criteria-referenced basis. Make clear your criteria for evaluating students’ work.

Structure Positive Interdependence: Students must believe they “sink or swim together.” Always establish mutual goals (students are responsible for their own learning and the learning of all other group members). Supplement goal interdependence with celebration, reward, resource, role, and identity interdependence.

Structure Intergroup Cooperation: Have groups check with and help other groups. Extend the benefits of cooperation to the whole class.

Monitor and Intervene

*Structure Individual Accountability: Each student must feel responsible for doing his or her share of the work and helping the other group members. Ways to ensure accountability are frequent oral quizzes of group members picked at random, individual tests, and assigning a member the role of Checker for Understanding.

*Specify Expected Behaviors: The more specific you are about the behaviors you want to see in the groups, the more likely students will do them. Social skills may be classified as forming (staying with the group, using quiet voices), functioning (contributing, encouraging others to participate), formulating (summarizing, elaborating), and fermenting (criticizing ideas, asking for justification). Regularly teach the interpersonal and small group skills you wish to see used in the learning groups.

Monitor Students’ Behavior: This is the fun part! While students are working, you circulate to see whether they understand the assignment and the material, give immediate feedback and reinforcement, and praise good use of group skills. Collect observation data on each group and student.

Intervene to Improve Taskwork and Teamwork: Provide taskwork assistance (clarify, reteach) if students do not understand the assignment. Provide teamwork assistance if students are having difficulties in working together productively.

Evaluate and Process

Evaluate Student Learning: Assess and evaluate the quality and quantity of student learning. Involve students in the assessment process.

*Process Group Functioning: Ensure each student receives feedback, analyzes the data on group functioning, sets an improvement goal, and participates in a team celebration. Have groups routinely list three things they did well in working together and do the same thing they will do better tomorrow. Summarize as a whole class. Have groups celebrate their success and hard work.
### Cooperative Lesson Planning Form

**Subject Area:**

**Date:**

**Lesson:**

---

### Objectives

**Academic:**

**Social Skills:**

---

### Preinstructional Decisions

**Group Size:**

**Method Of Assigning Students:**

**Roles:**

**Room Arrangement:**

**Materials:**

- One Copy Per Group
- One Copy Per Person
- Jigsaw
- Tournament
- Other: ____________________

---

#### Explain Task And Cooperative Goal Structure

1. **Task:**

2. **Criteria For Success:**

3. **Positive Interdependence:**

4. **Individual Accountability:**

5. **Intergroup Cooperation:**

6. **Expected Behaviors:**

---

---

### Monitoring And Intervening

1. **Observation Procedure:**

- Formal
- Informal

2. **Observation By:**

- Teacher
- Students
- Visitors

3. **Intervening For Task Assistance:**

4. **Intervening For Teamwork Assistance:**

5. **Other:**

---

### Evaluating And Processing

1. **Assessment Of Members’ Individual Learning:**

2. **Assessment Of Group Productivity:**

3. **Small Group Processing:**

4. **Whole Class Processing:**

5. **Charts And Graphs Used:**

6. **Positive Feedback To Each Student:**

7. **Goal Setting For Improvement:**

8. **Celebration:**

9. **Other:**

---
Resources

• Design Framework – How People Learn (HPL) & Understanding by Design (UdB) Process

• Content Resources

• Cooperative Learning
  – Cooperative Learning (Johnson, Johnson & Smith) - Smith web site – www.ce.umn.edu/~smith

• Other Resources
  – University of Delaware PBL web site – www.udel.edu/pbl