

Peer Learning Guide

Evidence, Design Principles, and Examples

Introduction

This guide is made available to promote the increased use of Peer Learning. Rather than being an additional burden, Peer Learning *reduces the pressure on teachers*; instead of having to be the “sage on the stage” at all times during a class, teachers become the “guide on the side” as students teach and learn with one another. With Peer Learning, each student in the classroom becomes a *source of learning and support* for other students. As students are working, the teacher is free to move around the room, listen to the conversations, provide assistance and coaching, and intervene where needed to support groups with their learning or teamwork. Students that need more attention can get the extra help they need from teachers (and peers) during a Peer Learning lesson.

What is Peer Learning?

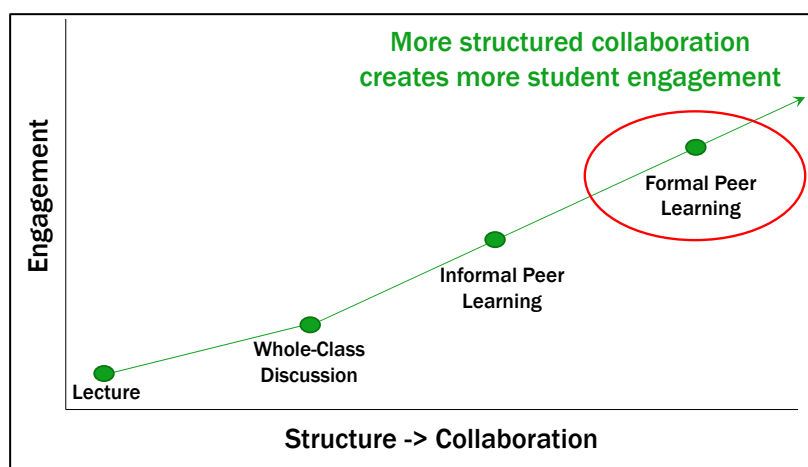
Peer Learning is a way to get students *actively involved* in their learning, where they create expectations for one another and then hold each other to those expectations. In essence, you can recruit your students as assistant teachers and get them working with and supporting one another. Peer Learning provides mechanisms and structures you can use to recruit the students in your classroom as a resource to support the success of everyone, particularly for those students at risk.

Rather than being focused solely on the learning of information, Peer Learning also can be used for *discussion, assimilation, application, synthesis, and generalization*. This process is similar to teacher education; as teachers, you learned by doing, leveraging an established process for active involvement in learning as a student teacher. In this process of learning-by-doing, *peers can be a valuable resource* because they have only recently learned something and can understand the struggles that someone may have in grasping new concepts. Peers are able to explain things in a way that can resonate with other students, and the process of explaining, helping, and supporting one another builds comprehension and recall, as well as stronger social bonds.

Most of the material in this guide represent more structured forms of Peer Learning. When more structure is used (i.e., when group interactions are more structured over extended periods of time), then *the positive effects of small-group learning are more pronounced*. Student engagement and learning are greater, and students have the opportunity to develop positive social bonds while they learn through extended social contact. These social bonds can promote positive student behavior and mental health, and create equity and inclusion for members of disadvantaged groups.

This is not to say that less structured forms of Peer Learning are not beneficial; rather, the ideal implementation would include a variety of different techniques and different levels of structure. The options are presented in this

guide in ascending order, from the least structured (e.g., Base Groups and other types of Informal Peer Learning) to the moderately structured (Group Inquiry and Peer Tutoring) to the highly structured (Group Projects and Jigsaw). These moderately and highly structured lessons are considered to be Formal Peer Learning. More detail is provided on each of these different forms of Peer Learning below.



Does it work?

Reviews encompassing 8 decades of research on tens of thousands of students from around the globe find that Peer Learning consistently generates much larger effects on a variety of outcomes, including behavior, social-emotional skills, mental health, and academic engagement and achievement.

For example, Peer Learning can significantly reduce bullying ($ES = -.30$; Van Ryzin & Roseth, 2019), and victimization ($ES = -.36$; Van Ryzin & Roseth, 2018a). These effects are larger than those found in traditional bullying prevention programs, which either find small effects (Gaffney et al., 2021) or no effects at all (Evans et al., 2014). Similarly, Peer Learning can reduce substance use ($ES = -.58$ to $-.60$; Van Ryzin & Roseth, 2018b) with effects sizes that are much larger than traditional substance use prevention programs, which either find small effects (Sandler et al., 2014) or no effects at all (Hodder et al., 2017). In a recent cost-benefit analysis, it was determined that Peer Learning yields \$22.54-\$101.39 in benefits per dollar invested as a result of this reduced risk for substance use in adolescence (Van Ryzin et al., 2022).

In addition, Peer Learning can promote prosocial behavior ($ES = .33$; Van Ryzin et al., 2020) and social-emotional skill development (i.e., cognitive/affective empathy; $ES = .26$ to $.45$; Van Ryzin & Roseth, 2019). In addition, Peer Learning is one of the few universal school-based approaches that have shown significant effects on student mental health. Specifically, Peer Learning can reduce student stress ($ES = -.24$) and emotional problems ($ES = -.29$; Van Ryzin & Roseth, 2021). This stands in contrast to many existing universal school-based mental health programs, which demonstrate effects on perceptions and attitudes, but no effects on mental health itself (e.g., Sources of Strength; Wyman et al., 2010).

With regards to academic outcomes, in a meta-analysis including over 17,000 students, Peer Learning was found to increase student academic engagement ($ES = .42$ to $.48$) and achievement ($ES = .46$ to $.55$; Roseth et al., 2008). These effects held across student ages/grades and racial/ethnic groups. Finally, Peer Learning can reduce bias, prejudice, and enhance inclusion and cross-ethnic peer relations (Johnson & Johnson, 2000; Slavin & Cooper, 1999). Peer Learning can also reduce disparities in social and academic outcomes for students of color (Van Ryzin et al., 2020) and students with disabilities (Van Ryzin et al., under review), creating greater equity in education.

These positive effects do not differ by school subject and grade level, and Peer Learning can be used in any subject from kindergarten to graduate school, or even in adult learning. However, the results do depend on the quality of the implementation. If some of the core design principles are left out, then the effects can be reduced. These core design principles are described below.

How does it work?

The more structured forms of Peer Learning require greater understanding of the core design principles that form the basis for Peer Learning. There are four core design principles to Peer Learning; each are discussed in more detail on the following pages.

1. Incentive to collaborate: Positive interdependence encourages students to get involved in the learning of their classmates.
2. Individual accountability: Every student has an important role to play, and peer expectations change the classroom dynamic.
3. Explicit training in group skills: Scaffolding, observing, recognizing/reinforcing.
4. Post-lesson group processing and celebration: Individual/group reflection.

1. Positive Interdependence: The Incentive to Collaborate

Teachers can incentivize students to collaborate with one another in small learning groups by creating positive interdependence within the group. With positive interdependence, individual objectives are aligned with the objectives of the group such that individual success promotes the success of the group and vice versa. When established successfully, positive interdependence ensures that everyone understands that each group member's contributions are vital to group success. In other words, the group can achieve a greater level of success as a unit than they could achieve alone, as long as each group member is successful in doing their job; this creates an incentive to collaborate. In addition, when students recognize that the group can attain a greater level of success when each team member fulfills their role, the resulting peer expectations serve as a powerful individual motivator. Examples of mechanisms to create positive interdependence are provided below.

When students understand that they can benefit from the success of others in their group, group members are more likely to encourage and support the learning of others in their group. This stands in contrast to other learning situations, where individual success does not impact the success of other students, or, potentially, individual success has a negative impact on other students, such as when teachers grade on a curve, or provide special recognition only for high-achieving students. In these situations, students have either no incentive to help others, or they have an incentive to interfere with the learning of others, which is the opposite of positive interdependence.

Examples:

- Teachers may implement goal interdependence, in which they require a single finished product from a group. This is the most commonly implemented form of positive interdependence, but generally requires other forms of interdependence in order to be successful. For example, it is often paired with role, task, or resource interdependence to ensure that each student has a well-defined job that they must perform to contribute to group success, ensuring that all members are actively contributing rather than loafing.
- A lesson may specify an interconnected set of roles (role interdependence) such that the students must collaborate in order to complete the lesson. The roles are often functional (e.g., Reader, Checker, Recorder, Timekeeper). The key to creating good roles is to make them clear and concise so that students can easily understand their role and be held accountable for fulfilling it. Role assignment (like task assignment, see below) should be at random to avoid labeling or pigeonholing students.
- A lesson may specify an interconnected set of tasks (task interdependence), such as a science experiment or math problem that is decomposed into a series of steps, with each student responsible for their own step(s). A lesson could also ask the group to write an essay or develop a presentation, with each student responsible for writing a certain section. Other examples could be designing tasks that refer to specific aspects of a historical civilization (e.g., economy, political structure, religious beliefs) or dimensions of a literary work (e.g., themes, characters, symbolism).
- A lesson may have interconnected materials (resource interdependence), such as when the group has to solve a problem or a puzzle, and each group member has their own unique set of tools, clues, or materials (as in a jigsaw lesson, see below).
- Teachers can also use reward interdependence, in which they offer a reward to the group (e.g., bonus points) if all members of the group achieve above a certain threshold on an individual assessment. For example, a teacher could offer each group member a bonus if every member scores above 80% on an assessment.

2. Individual Accountability

Teachers can ensure that each student contributes to group success by implementing individual accountability. When established successfully, students are aware that they have a specific job within the group, that their group members are counting on them, and that the teacher (and their peers) will hold them accountable for their individual performance. Example mechanisms for ensuring individual accountability are provided below.

A key issue with many small-group lessons is the lack of individual accountability. When this is missing, some students may not be willing to contribute to group success, forcing other members of the group to do more work. This can lead to negative academic outcomes (as some students fail to learn the material) as well as negative social outcomes (as hardworking students are resentful of those students who do not contribute).

To ensure that small-group instruction promotes both positive academic and social outcomes, each group member's job must be explicit to everyone, and there must be a mechanism for the teacher and other group members to hold each student accountable for their contribution. Ideally, each group member's job within the group would be assigned at random, to promote fairness and reduce any sense of favoritism, and to avoid labeling or pigeonholing students into specific jobs.

Examples:

- An assessment (e.g., a quiz or end-of-unit test) can be explicitly linked to the material that is covered in the small-group lesson, and students must understand the necessity of participating in the lesson in order to do well on the assessment; for example, the teacher may allow students to use their lesson notes during the assessment, which incentivizes more active participation in the lesson. The effect of this type of accountability can be amplified if the teacher offers group rewards linked to group members' performance on the assessment (i.e., reward interdependence, a type of positive interdependence, see above).
- During or after the lesson, the teacher may choose a student at random from each group to summarize the group's thinking and/or their progress in completing the lesson. The ability of a randomly selected group member to provide an accurate summary may be graded by the teacher and contribute to either the individual score on the lesson, or to both the individual and the group score. If the reporting student is chosen at random, then all students must be prepared to report.
- A teacher may also choose to integrate an individual follow-up activity into the lesson, where each student is responsible for applying what they learned to solve a new problem or complete a new task, which can be graded individually. This is in contrast to a group follow-up activity, which is completed by the group and graded accordingly. Both types of follow-up activities can be useful, but the individual follow-up activity provides a further opportunity for reward interdependence (see above).
- Notably, good practice requires that a student's individual score can only be helped by the performance of others in the group, never harmed. Thus, rewards that can be obtained from other group members doing well on an assessment (i.e., reward interdependence, see above) should be a bonus rather a graded component of the assessment. In addition, the ability of a student to summarize the group's progress, or individual performance on a follow-up activity (see above) can also be treated as a bonus at the group level, even if it is graded at the individual level.

3. Group Social Skills

Teachers can ensure that small learning groups function smoothly by explicitly integrating the development of *group social skills* into the lesson. These social skills should be explicitly *defined and scaffolded* for the students at the beginning of the lesson, with examples provided. Group social skills are those that contribute to the proper functioning of a learning group, such as sharing ideas, checking for understanding, or summarizing the group status; examples are provided below with sentence starters. When this sort of deliberate effort is put into developing group social skills, it amplifies the social and academic gains from Peer Learning.

During the lesson, the teacher *observes (or listens) for these skills* and may offer class-level rewards if the class as a whole meets or exceeds a goal that can be established at the beginning of the lesson; the goal is usually a count of a number of times that the teacher wants to observe (or hear) the targeted social skill during the lesson. When students understand that the teacher is observing for a specific group social skill, they often try to integrate an example or sentence starter into their group interactions while the teacher is watching or listening. This may seem a bit artificial at first, but it becomes *more natural over time* as students build their skills.

Good practice is to hold a post-lesson reflection with the class where the teacher *highlights specific examples* of the targeted social skill that were observed during the lesson; it is especially important to include one or more examples that involve an at-risk student that may normally be less engaged in learning. This form of positive behavior support can contribute to greater levels of engagement among students and more positive teacher-student relationships.

Examples:

Encouraging Participation	Sharing Ideas
Sounds like: <ul style="list-style-type: none"> “What do you think about...?” “That’s an interesting idea!” “I see what you mean. Tell me more.” 	Sounds like: <ul style="list-style-type: none"> “I think that...” “We could try...” “I suggest that we...”
Offering to Explain	Checking for Understanding
Sounds like: <ul style="list-style-type: none"> “Would you like to go over this again?” “Let’s review to make sure we all get it.” “Let me try to explain...” 	Sounds like: <ul style="list-style-type: none"> “Do you know how to...?” “Can you explain...?” “Does that make sense to you?”
Asking for Clarification	Summarizing Group Status
Sounds like: <ul style="list-style-type: none"> “I have a question about...” “What did you mean when you said...” “Can you show me how to...?” 	Sounds like: <ul style="list-style-type: none"> “So what you are saying is that...” “Let’s review what we have so far.” “Our key ideas seem to be...”
Creating Links	Overcoming Barriers
Sounds like: <ul style="list-style-type: none"> “How does this relate to...?” “The last time we did something like this ...” “Another example of this is...” 	Sounds like: <ul style="list-style-type: none"> “Is there another way to look at this?” “Let’s brainstorm other ideas.” “What are we missing here?”

4. Group Processing and Celebration

After the group-based portion of the lesson is completed, group members should be given the opportunity to reflect and discuss what they did well as a group during the lesson and how they could improve next time. This process can also involve setting specific goals for future group work. This reflection can encourage the development of group skills and a commitment to succeeding with small-group learning. Example approaches to group processing are provided below.

In addition, to celebrate their success, group members should have the opportunity to give each other some specific positive feedback about something helpful that each person did during the lesson. Each student should offer specific positive feedback to each other student in the group. This form of positive behavior support can gradually build more collaborative student behavior, particularly for at-risk students; the positive feedback from peers is especially powerful in modifying behavior!

The positive emotions generated by this feedback will contribute to the development of positive relationships among the students and accelerate the rate at which they become comfortable working with one another. If groups are built at random, which is considered best practice, then each student in the classroom will eventually have the opportunity to work with (and build a positive relationship with) each other student in the class. This creates a positive feedback loop where students become more comfortable with one another and thus are more willing to actively contribute to small-group lessons, which further enhances their peer relationships.

Having students select their own groups is not recommended, as students will pick their friends and often socialize instead of paying attention to the lesson. Further, students without friends, or with a lower social status, will not get picked by anybody, which is an extremely negative social experience.

Examples of Group Processing:

- Each group member identifies three things that the group did well and one thing that they can do better next time, then shares with the rest of the group. The group reaches consensus on the one thing they can do better next time and (potentially) sets a specific goal.
- Each group member rates their own engagement, enjoyment, and amount learned during the lesson, shares their scores with their group, and explains their ratings. Each group member (potentially) sets a goal for their engagement next time.
- If it can be done confidentially, each group member can rate the contribution of others in the group, which can serve as an opportunity for a group bonus or reward if each group member obtains high ratings from their collaborators (this is an example of reward interdependence, a type of positive interdependence).

Examples of Celebration:

Positive Peer Feedback

Sounds like:

- “I liked it when you...”
- “It helped me to learn when you...”
- “You did a good job with...”

Peer Learning Examples

Least Structured: Base Groups (Check-In/Check-Out)

Students are assigned to be in groups of two to four, and these groups meet for a few minutes at the beginning and the end of every class. At the beginning of the class, the students are asked to Check-In, which includes opportunities for both personal support (“How are you doing?”) and discussion questions from the previous lesson. A “presenter” chosen at random can summarize the group’s academic (but not personal) discussion. And the end of the class, the groups Check-Out with each other, discussing how engaged they were in class and whether they have questions about the class content. Unlike other types of Peer Learning, these groups usually retain the same membership for the entire term to enable the students to develop strong relationships.

Least Structured: Informal Peer Learning (Think-Pair-Share)

The students initially think by themselves about the topic being presented. Then they pair with another student or two, designated by the teacher, to discuss the topic. The pair then share their thoughts with the class. The “presenter” from each group is chosen at random, so all group members must be prepared.

Moderately Structured: Group Inquiry

Students are assigned to a group of two to four students at random, and the group works together on a problem. Each student has a specific role (e.g., Reader, Recorder, Presenter), creating role interdependence. The group should identify three possible strategies or answers and pick the best one. The group must submit a single answer, and each group member should be ready to explain the reasoning behind the group’s answer.

Moderately Structured: Peer Tutoring

In this lesson, pairs of students work together to review material or practice specific skills (e.g., spelling, vocabulary, mathematical concepts). One member of the pair has questions only (the “player”), while the other has questions and answers (the “coach”). Once the “player” has finished and submitted their work, the two switch roles. The “player” becomes the “coach”, and vice versa, using a new set of materials.

Highly Structured: Group Project

Groups of two to four students work together on a project. The group submits a single project, but the overall project is broken down into pieces, with each student in the group responsible for one piece. To complete the project, each group member must contribute their piece. The pieces of the project are graded separately, but if the pieces fit well together into a single coherent project, then the group can earn a bonus on their grade (i.e., reward interdependence, whereby other group member’s work can help but not hinder the grade).

Very Highly Structured: Jigsaw

The students are divided into groups of two to four at random, with each group member being given a different segment of the assigned material. Each student is given time to become an expert on the material in the company of one or more other students who have the same assignment. Then, as an expert, each student joins a jigsaw group to teach their segment and learn the other segments from the other group members

All of the moderately and highly structured example lessons include goal interdependence (i.e., the group submits a single answer) and the latter three include task interdependence (i.e., students rely on others to perform specific tasks in order to complete the assignment). All lessons can include reward interdependence, where individual scores on an assessment can contribute to group rewards. All lessons can also include individual accountability, whereby each group member must be ready to explain the reasoning behind the group’s answer or individually solve a problem similar to that presented in the lesson. Finally, all lesson should include the development of group social skills and group processing/celebration as discussed above.

Additional Small-Group Best Practices

In addition to the four key design principles of Peer Learning, educators can also promote positive peer relations by applying the following best practices in any situation where students are interacting directly with one another.

1. Build mutual disclosure into *everything*.
 - Start every group activity with some icebreaker or sharing questions that give your students an opportunity to get to know one another (e.g., the person with the most brothers/sisters goes first).
 - The teacher should also participate in mutual disclosure. Your students want to know who you are. If they feel like they know you, they will be more open to your influence.
 - Consistent base/home groups can be used for daily check-in. These are groups that stay together for an extended period, such as one term or semester. Their main purpose is emotional support rather than learning.
2. Ensure students are *taking turns* within their groups, with the order assigned at random.
 - Explicit turn-taking reduces the influence of assertive students and allows more reticent students to have a voice.
 - The turn-taking mechanism can be an opportunity for disclosure. For example, the person with the most pets or the earliest birthday will go first.
 - You can also use a random mechanism like popsicle sticks or a random name picker (such as <https://www.gigacalculator.com/randomizers/random-name-picker.php>).
3. Get students working with a *variety of other students* in the class.
 - It is considered best practice to assign group membership *at random*. This ensures that each student has an opportunity to work with each other student in the class over time. These diverse groupings encourage a sense of camaraderie in the class and support student belonging.
 - Having students select their own groups is NOT recommended, as they will pick their friends and socialize, while students without friends will not get picked by anybody, which is a very hurtful social experience.

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