

Research Guide

College and Career Competency: *Teamwork*

Definition:

Teamwork can be defined as working with others to achieve common goals. It requires the ability to both cooperate and communicate with others (Holloway, 2003). Effective teamwork requires group decision making and planning, **adaptability** and flexibility, **social awareness**, and **communication** skills (Baker, Horvath, Campion, Offermann, & Salas, 2005). See also: www.nde-ed.org/TeachingResources/ClassroomTips/Teamwork.htm (NDT Education Resource Center, n.d.).

Essential Components for Students:

1. Work effectively with others to achieve a common goal.
2. Do your fair share of any team assignments.
3. Share your ideas or express your opinions while being open to others' ideas, opinions, and perspectives.
4. Respect your fellow team members even when you don't agree with them.

Research:

- As the use of teams in the workplace has increased over the past 20+ years, so too has the importance of teamwork skills (Hansen, 2006). Teamwork is considered to be an important non-academic skill for success in the workplace (Lerman, 2013).
 - Community-based work experiences (i.e., internships and apprenticeships) are more successful than many job training programs in helping students develop expertise in teamwork and **problem solving** because students can develop the skills in the context of an actual workplace (Lerman, 2013).
- Researchers conducting a qualitative study with 6th and 7th graders who were engaged in cooperative learning teams found that the teacher plays an important role in successful outcomes by setting the conditions for cooperative learning (Mueller & Fleming, 2001).
 - The study found that cooperative learning groups are most successful in helping students build teamwork skills when three conditions for students are met: 1) sufficient time to talk and plan, 2) the opportunity to exchange ideas, and 3) the opportunity to present results to one another and to others outside the group (Mueller & Fleming, 2001).
- When students work in teams to achieve a common goal, as in cooperative learning, learning is enhanced. This is because social interaction is an important part of learning (Salomon & Perkins, 1998) and cooperative learning enhances social interaction (Dotson, 2001). Cooperative learning has also been found to have a positive effect on achievement (as measured by curriculum-specific and standardized tests), particularly in language arts for vocabulary (Slavin, 1980, 1987).
- Researchers found that applying cooperative learning structures like Think-Pair-Share, Rallytable, and Teammates Consult resulted in higher curriculum-based assessment scores for 6th grade students with a wide range of SES levels (Dotson, 2001).
- Teachers can help students transfer teaming skills outside the classroom by incorporating these five principles in teaming instruction and projects: 1) perceived relevance of teaming, 2) practice and feedback, 3) follow-up, 4) identifying contexts outside the classroom where teaming is important, and 5) applying teaming skills to other projects (Ettington & Camp, 2002). See **Instructional Strategies** section for more detail.

- It is important to build the right classroom climate to promote teamwork. Stressing an individualistic or competitive climate in the classroom will negate the effectiveness of cooperative learning (Johnson, Johnson, & Stanne, 2000). In contrast, collaboration and cooperative learning can be promoted by encouraging student interaction, mutual goals, and joint rewards (Johnson et al., 2000).
- Teamwork, also known as *collaborative learning*, can have a better impact on learning than when students work alone. Working in groups enables students to retain larger quantities of information and promotes brainstorming of new ideas (Kuo, Hwang, & Lee, 2012).

Assessments:

- A web-based template called the Self and Peer Assessment Resource Kit (SPARK), which was developed in the late 90s, has been used to assess teamwork at the post-secondary level (Freeman & McKenzie, 2002). It includes separate interfaces for instructors and students. For more information, see <http://spark.uts.edu.au/>.
- A checklist to determine if a group works as a team can be found at the University of Waterloo, Centre for Teaching Excellence website: <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/tips-students/being-part-team/teamwork-skills-being-effective-group-member> ("Teamwork skills," n.d.).
 - The checklist asks each member of a group to decide if certain statements, such as "We all show equal commitment to our objective," apply to the team.
- A rubric that allows teachers to measure each student's teamwork skills across 7 categories (4 of which are shown below) can be found at the RubiStar website: http://rubistar.4teachers.org/index.php?screen=ShowRubric&rubric_id=1170870& (University of Kansas Advanced Learning Technologies, 2005).

CATEGORY	4	3	2	1
Attitude	Never is publicly critical of the project or the work of others. Always has a positive attitude about the task(s).	Rarely is publicly critical of the project or the work of others. Often has a positive attitude about the task(s).	Occasionally is publicly critical of the project or the work of other members of the group. Usually has a positive attitude about the task(s).	Often is publicly critical of the project or the work of other members of the group. Often has a negative attitude about the task(s).
Focus on the task	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task.	Rarely focuses on the task and what needs to be done. Lets others do the work.
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.
Contributions	Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate.

- The Peer and Self-Evaluation System (PSES) is used by high school students to record observations about attitudes and skills demonstrated by teammates, with resulting reports helping teachers understand more about peer interaction (Strom, Strom, & Moore, 1999).

- The PSES was successfully field tested with 300 students from a high school in Phoenix and found to be a reliable instrument to both measure and build awareness about team skills (Strom et al., 1999). The *Team Skills Observed by Peers and Self* form is included below (Strom et al., 1999, p. 542).

Team Skills Observed by Peers and Self

1	Demonstrates acceptable attendance for team meetings
2	Arrives on time to participate in team activities
3	Focuses attention on the team task so there is no waste of time
4	Fulfills rotation roles such as facilitator, recorder, and reporter
5	Can be counted on to do a fair share of the team assigned work
6	Admits ignorance and uncertainty about topics and ways to proceed
7	Asks questions that help to understand and complete class lessons
8	Teaches peers by explaining or reviewing concepts and assignments
9	Brings relevant reading materials for teammates to examine in class
10	Refers to reading materials as a basis for enhancing the discussions
11	Can be counted on to disclose feelings, opinions, and experiences
12	Speaks clearly and uses vocabulary that can be easily understood
13	Limits the length of comments so other people have a chance to talk
14	Listens to everyone in the group and considers their points of view
15	Encourages teammates and recognizes contributions of individuals
16	Explores viewpoints and suggestions that may not be liked at first
17	Uses logic to challenge the thinking and work methods of the team
18	Practices reflective thinking and avoids making hasty conclusions
19	Combines and builds on the ideas that are expressed by others
20	Discovers different ways of looking at things and solving problems
21	Responds well whenever peers disagree or express their criticism
22	Avoids blaming and judging teammates for difficulties or mistakes
23	Accepts compromise when it is the best way to overcome conflicts
24	Keeps trying even when the task or situation becomes demanding
25	Expresses optimism about the team being able to achieve success

- Some assessment approaches consist of team self-report, situational judgment, and teacher report (Wang, MacCann, Zhuang, Liu, & Roberts, 2009). Examples of each are shown below.
 - The self-report consists of 57 items that assess four domains of teamwork: cooperate (15 items), advocate (12 items), negotiate (17 items), and guide others (13 items). Students used a six-point scale from *never* to *always* (Wang et al., 2009).
 - Situational judgment involves presenting the students with a scenario that involves an aspect of teamwork and having them rate different approaches for the specific situation. Expert judgment is used to identify the best response (Wang et al., 2009).
 - The teacher report form is displayed below (Wang et al., 2009, p. 114):

Teacher-rating scale. Teachers evaluated each student's level of teamwork against ten behaviorally anchored items. A sample item follows:

When working on a group goal or project, this student				
(1)	(2)	(3)	(4)	(5)
ignores or does not notice others' ideas or suggestions		listens to others' contributions		always listens to others and respects their contributions

Instructional Practices:

- The teacher plays an important role before, during, and after a team project by helping ensure that the assignment produces transferable teaming skills (Ettington & Camp, 2002):
 - First, design a project with specific development and content learning objectives in mind. For example, develop assignments that are meaningful and relevant for the group and that cannot be completed by individuals working independently.
 - Introduce students to the group project in a way that highlights both teamwork skill development as well as the content learning objectives. For example, explain why specific skills are important to future career success. Also, encourage students to discuss past experiences with teams in order to identify potential issues and resistance.
 - Form the teams based on skill requirements for the assignments. Once the technical skills have been identified, see how those skills are distributed in the class. If multiple team projects will be assigned, allow the same group to remain together so the team can develop their own group processes.
 - During the team project, monitor group progress and help each team move through the various stages of team development. Either require interim reports from the team or meet with them informally to assess progress. Observe group meetings and provide feedback.
 - After the project is complete, evaluate and reinforce the development of teamwork skills. Have the team members use peer evaluations to provide feedback to one another on teamwork skills. Also, debrief students on their development of teamwork skills as well as the accomplishment of the content learning objectives. Have students share insights and lessons learned in class. Ask each student to develop an action plan that helps them further develop their teamwork skills, then reinforce teamwork skills in other assignments.
- One approach to building student teams that has been applied successfully by college instructors with undergraduates involves a template with three components: introduction to teams (which includes an exercise), identifying team member expectations, and completing a team self-assessment (Siciliano, 1999). Examples adapted from Siciliano, 1999, pp. 262-263:

TABLE 1. Team Template**1. Introduction to Teams** – Item Count Exercise (15 min)

An overhead slide is shown for 15 seconds to students, who list as many different items as possible. In teams, students cross-check their items to form a single listing for the team. Benefits of working in teams are reviewed. Students discuss previous team experiences, both positive and negative, as a transition to the next session (developing criteria).

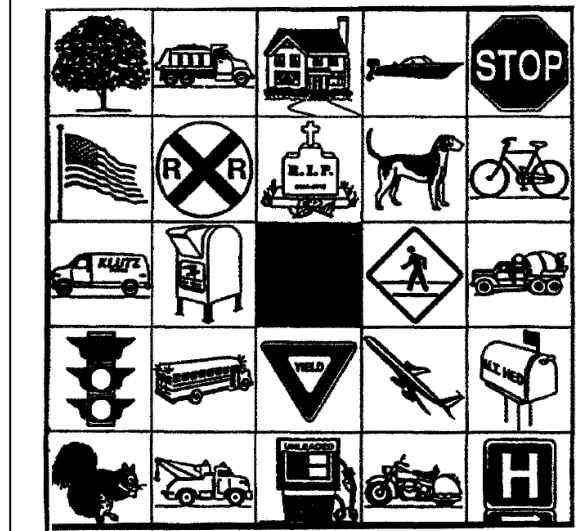
2. Team Member Expectations – Ideal Team Member Criteria Exercise

- Teams identify five or six characteristics of an ideal team member. Team lists are combined, and class-specific criteria with brief descriptions are formulated. (15-20 min) – OR –
- Distribute criteria already developed and modify as needed. (5 min)

3. Team Assessment – Assessment Instrument (criteria listing w/ rating scale)

- Midterm Team Feedback: Individuals complete the instrument without sharing results with fellow team members. The instructor collects copies, totals are averaged and team scores, which are disguised, are given to students during the next class. (15-20 min) – AND/OR –
- Individual Assignment: Individuals complete the instrument without sharing results with fellow team members. Each team member's score is averaged and becomes the individual's grade for this component of the course. (5-10 min)

Note: Time allotments are in-class estimates. Step 2 and 3 require faculty time outside of class to summarize criteria and average scoring results.

FIGURE 1. Item Count Exercise**TABLE 2. Ideal Team Member Criteria**

The class developed criteria for the ideal team member as follows:

1. *Do your part*
Complete the tasks assigned to you.
Be willing to put in the time necessary to complete your team assignment.
Ask if there is anything you can do.
Pull your own weight and do your share of the assignments.
2. *Share your ideas*
Express your opinions.
Respond to other group members' ideas.
Ask other group members for their ideas.
3. *Work toward agreement (consensus)*
Be open to other ideas, opinions, and perspectives.
Be willing to work together.
Work as a team (not solely on an individual basis).
4. *Keep a positive attitude*
Maintain a sense of humor.
Be courteous.
Give feedback in the form of constructive criticism.

TABLE 3. Ideal Team Member Assessment Instrument

Please evaluate your team members using the following scale:

5 = *always performed in this way*

4 = *often performed in this way*

3 = *occasionally performed in this way*

2 = *rarely performed in this way*

1 = *never performed in this way*

Team member name	Did his/her part (5, 4, 3, 2, 1)	Shared ideas (5, 4, 3, 2, 1)	Worked toward agreement (5, 4, 3, 2, 1)	Kept positive attitude (5, 4, 3, 2, 1)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Your name (do not score yourself) _____

- Instructors can facilitate teamwork and cooperative learning by guiding learning through a problem-based exercise where students work in a small group to solve concrete problems (Hmelo-Silver, 2004).
 - The exercise begins with a realistic and ill-structured problem, such as those normally found in real life. Unlike well-structured problems, which have clear-cut solutions, ill-structured problems engage students as active learners while fostering the discovery of new rules and concepts (Kiili, 2005). The students identify facts, generate ideas, and identify concepts (“learning issues”) that they need to learn more about before they can solve the problem. They independently research the learning issues, then regroup to share what they learned. The students also reconsider any hypotheses or generate new hypotheses based on the learning. Finally, the students reflect on the problem as well as their self-directed and collaborative learning experiences.
 - The teacher’s role is to facilitate the learning process and model the reasoning and problem-solving strategies.
 - Collaboration occurs as the students negotiate ideas and understand what new knowledge each team member brings to the group.
 - Tools can include a structured whiteboard with columns identifying the facts, ideas, learning issues, and an action plan.
- Assigning specific roles to team members like facilitator or note taker can help the team operate more effectively. For more information about team roles see the University of Waterloo, Centre for Teaching Excellence resources: <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/developing-assignments/group-work/group-roles-maximizing-group-performance> (“Group roles,” n.d.) and <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/tips-students/being-part-team/teamwork-skills-being-effective-group-member> (“Teamwork skills,” n.d.).
- Applying cooperative learning structures like Think-Pair-Share, Rallytable, and Teammates Consult can increase assessment scores (Dotson, 2001).
 - Think-Pair-Share - The teacher poses a question to the class and the students think about their response. Then students pair with a partner to talk over their ideas. Finally, students share their ideas with the class.
 - Rallytable - Students take turns writing on one piece of paper or completing steps in a task.
 - Teammates Consult - Students all have their own copy of the same worksheet or assignment questions. A large cup is placed in the center of each team, and students begin by placing their pencils in the cup. With pencils still in the cup, they discuss their answers to the first question. When

- all team members are ready, they remove their pencils from the cup and write their answers without talking. They repeat this process with the remaining questions.
- For more information about cooperative learning structures, see http://www.kaganonline.com/free_articles/research_and_rationale/increase_achievement.php (Dotson, 2001).
 - For articles and videos on specific cooperative learning strategies, see <http://ethemes.missouri.edu/themes/1746> (University of Missouri, 2014).
 - When working with student teams, the teacher plays an active role by acting as the team supervisor and encouraging students to develop psychological contracts that consist of shared expectations about roles, rules of conduct, and desired outcomes (Page & Donelan, 2003).

References

- Baker, D.P., Horvath, L., Campion, M., Offermann, L., & Salas, E. (2005). The ALL Teamwork Framework. In T.S. Murray, Y. Clermont, & M. Binkley (Eds.), *Measuring Adult Literacy and Life Skills: New Frameworks for Assessment* (pp. 229-272). Ottawa, Ontario: Statistics Canada. Retrieved from <http://en.copian.ca/library/research/measlit/part3.pdf>
- Dotson, J.M. (2001). Cooperative learning structures can increase student achievement. *Kagan Online Magazine*. Retrieved from http://www.kaganonline.com/free_articles/research_and_rationale/increase_achievement.php
- Ettington, D.R., & Camp, R.R. (2002). Facilitating transfer of skills between group projects and work teams. *Journal of Management Education*, 26(4), 356-379. doi: 10.1177/105256290202600404
- Freeman, M., & McKenzie, J. (2002). SPARK, a confidential web-based template for self and peer assessment of student teamwork: Benefits of evaluating across different subjects. *British Journal of Educational Technology*, 33(5), 551-569. doi: 10.1111/1467-8535.00291
- Hansen, R.S. (2006). Benefits and problems with student teams: Suggestions for improving team projects. *Journal of Education for Business*, 82(1), 11-19. doi: 10.3200/JOEB.82.1.11-19
- Hmelo-Silver, C.E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235-266. Retrieved from <http://link.springer.com.www2.lib.ku.edu/content/pdf/10.1023/B:EDPR.0000034022.16470.f3.pdf>
- Holloway, J.H. (2003). Research link/student teamwork. *Educational Leadership*, 61(4), 91-92. Retrieved from <http://www.ascd.org/publications/educational-leadership/dec03/vol61/num04/-Student-Teamwork.aspx>
- Johnson, D.W., Johnson, R.T., & Stanne, M.B. (2000). Cooperative learning methods: A meta-analysis. Retrieved from <http://www.ccsstl.com/sites/default/files/Cooperative%20Learning%20Research%20.pdf>
- Kiili, K. (2005). Digital game-based learning: Towards an experiential gaming model. *The Internet and Higher Education*, 8(1), 13-24. doi: 10.1016/j.iheduc.2004.12.001
- Kuo, F.R., Hwang, G.J., & Lee, C.C. (2012). A hybrid approach to promoting students' web-based problem-solving competence and learning attitude. *Computers and Education*, 58(1), 351-364. doi: 10.1016/j.compedu.2011.09.020
- Lerman, R. (2013). Are employability skills learned in U.S. youth education and training programs? *IZA Journal of Labor Policy*, 2(1), 1-20. doi: 10.1186/2193-9004-2-6
- Mueller, A., & Fleming, T. (2001). Cooperative learning: Listening to how children work at school. *The Journal of Educational Research*, 94(5), 259-265. doi: 10.1080/00220670109598761
- NDT Education Resource Center. (n.d.). Teamwork in the Classroom. NDT Resource Center. Retrieved from <https://www.nde-ed.org/TeachingResources/ClassroomTips/Teamwork.htm>
- Page, D., & Donelan, J.G. (2003). Team-building tools for students. *Journal of Education for Business*, 78(3), 125-128. doi: 10.1080/08832320309599708
- Salomon, G., & Perkins, D.N. (1998). Individual and social aspects of learning. *Review of Research in Education*, 23, 1-24. Retrieved from <http://www.jstor.org/stable/1167286>

- Siciliano, J. (1999). A template for managing teamwork in courses across the curriculum. *Journal of Education for Business*, 74(5), 261-264. doi: 10.1080/08832329909601694
- Slavin, R.E. (1980). Cooperative learning. *Review of Educational Research*, 50(2), 315-342. Retrieved from <http://www.jstor.org/stable/1170149>
- Slavin, R.E. (1987). Developmental and motivational perspectives on cooperative learning: A reconciliation. *Child Development*, 58(5), 1161-1167. Retrieved from <http://www.jstor.org/stable/1130612>
- Strom, P.S., Strom, R.D., & Moore, E.G. (1999). Peer and self-evaluation of teamwork skills. *Journal of Adolescence*, 22(4), 539-553. doi: 10.1006/jado.1999.0247
- University of Kansas Advanced Learning Technologies. (2005). Rubistar: Collaborative work skills - Collaborative teamwork skills. *4Teachers.org*. Retrieved from http://rubistar.4teachers.org/index.php?screen=ShowRubric&rubric_id=1170870&
- University of Missouri. (2014). Teaching Tips: Cooperative Learning Strategies. *eThemes*. Retrieved from <https://ethemes.missouri.edu/themes/1746>
- University of Waterloo. (n.d.). Group roles: Maximizing group performance. *Centre for Teaching Excellence*. Retrieved from <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/developing-assignments/group-work/group-roles-maximizing-group-performance>
- University of Waterloo. (n.d.). Teamwork skills: Being an effective group member. *Centre for Teaching Excellence*. Retrieved from <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/tips-students/being-part-team/teamwork-skills-being-effective-group-member>
- Wang, L., MacCann, C., Zhuang, X., Liu, O.L., & Roberts, R.D. (2009). Assessing teamwork and collaboration in high school students: A multimethod approach. *Canadian Journal of School Psychology*, 24(2), 108-124. doi: 10.1177.082957350933547