

# Supplemental Material

*CBE—Life Sciences Education*

Chang and Brickman

## Appendix A. Peer evaluation

Please rate each of your team members on their contributions to the performance of your group.

Their rating should be based on **all** the work done as a team. You may use non-integer values (i.e. 2.5). To receive all of the points your group earned for their group problem grade, a student's average score from all of their peers must be 3 or higher. Ratings of 1 and 4 should be reserved for very special cases. If you give a rating of 4 or less than 2 for any category, you must explain why in your comments.

Rate each team member based on the following scale:

1 = unacceptable performance, I would fire this person

2 = improvement needed

3 = good, met or exceeded all expectations

4 = outstanding, a rare individual

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| Preparation: Was this person reliably prepared for working on the group work?  | <input type="text"/> |
| Preparation: Could you count on this person to perform their part of the in-class group work?  | <input type="text"/> |
| Participation: Did this team member contribute their fair share of the work and actively participate in group assignments and tests? | <input type="text"/> |
| Participation: Did this person always seem to be working in your group meetings? Did you always see them in class?                   | <input type="text"/> |
| Collaboration: Did this person try their best to help the group function effectively?  | <input type="text"/> |
| Attitude: Did this person have a positive attitude that helped the group function? Were they pleasant to work with?                  | <input type="text"/> |
| Performance: Did this group member add substantially to the score on the group assignments and tests?                                | <input type="text"/> |
| Performance: Did this group member bring special skills to the task?   | <input type="text"/> |

## Appendix B. Interview Protocol

1. What is your major and what year are you in college?
2. How do you feel about your performance in this course?
3. What is the meaning of group work for you? What are benefits and challenges of group work in a large classroom?
  - a. Did you have any challenges or strategies that your group used for a successful group work?
4. (Related to group work in general)
  - a. How was the group composed? How did you use the group contract? How did you use the STEAMpeer evaluations and ratings?
  - b. How did your group communicate?
  - c. How did you group use role assignments?
    - i. How does your group discuss the topic during the class?
    - ii. What was your role in the group discussion?
  - d. Did you have meetings outside the class as a group?
5. (Related to instructor support)
  - a. How did the instructor prepare you for group assignments?
  - b. Describe how you used the following aspects of technology in the course: Checklist in the course management system; Email; Practice tests;clicker questions in class;and the discussion board to share study strategies.
6. Describe your perceptions about multiple individual and group-based activities. How do you perceive the activities conducted in this course?
7. If you could give a recommendation for next semester's class, what would you like to give?
8. Specifically related to the Unit 2, endocrine disruptors assignment:
  - a. Did you complete the individual assignment before having a group discussion?
  - b. How did your thoughts change after group discussion?

- c. How did your thoughts change after swapping with another group and receiving feedback?

## Appendix C. Codebook for Peer Evaluation Comments and Example Quotes

| Categories for Positive Perspectives (n=10) | Descriptions  | Quotes   |
|---|---|--|
| Clear Communication Channels                | Communicate promptly  | - <i>Richard responds to group text messages/ emails. (Lindsay)</i>  |
| Clear Role Recognition                      | Describe group member's role  | - <i>He has good leadership qualities and always keeps group projects organized and always wants to get things done in a timely manner. (Kalli)</i><br>- <i>Always very eager to take notes and complete handouts during class. (Jocelin)</i><br>- <i>Bryn is our manager. (Rose)</i>  |
| Emotional Support                           | Give positive vibe, energy  | - <i>Melody brings the group together very well and is overall a great asset to our team. (Lucien)</i><br>- <i>Cathy has a positive attitude that makes the group experience much more enjoyable. (Colene)</i><br>- <i>You are nice and you completely engage and put forth good ideas in the group. (Allys)</i>                         |
| Individual Accountability                   | Do their fair share, contribution, participation, class attendance, motivated   | - <i>May always does her part and completes her work in a timely and efficient manner. (Cory)</i><br>- <i>Wang is engaged in class, pays attention, and is good to work with. He pulls his weight and helps with all group work. (Iggy)</i>  |
| Learning Support                            | Elaborate on content, how concepts are related to each other, bring additional information, supporting or applying acquired knowledge to the activity group discussion, group test, creative minds. | - <i>Camella is good at explaining difficult concepts. (Cathy)</i><br>- <i>Hendrick helps us understand our in class work sheets. (Justin)</i><br>- <i>She really takes the time to learn the material so she can teach others information. (Wendy)</i>  |
| Positive Interdependence                    | Care and concern of group members for one another, encourage to work harder   | <ul style="list-style-type: none"> <li>• <i>Bryn is always willing to help out the group in whatever way she can (Lauren).</i></li> <li>• <i>I really appreciate being in a group with Liz as she encourages me to work harder. (Daniel)</i></li> <li>• <i>Sarah helps the other group mates to complete projects. (Elly)</i></li> </ul> |
| Procedural Support                          | Provided operational steps that are not integrally connected to cognitive activities,   | - <i>Liam is a great addition to the team and is always willing to keep everyone focused and turn in our papers at the end of class. (Avis)</i><br>- <i>Rosemary is very organized and keeps the group on track, schedules group meetings. (Javon)</i>   |

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|   | decision maker   |   |
| Social/Interpersonal Communication Skills         | Ability to interact and communicate with group members   | <ul style="list-style-type: none"> <li>- <i>Megan displays a positive attitude and is very encouraging.(Mateo)</i></li> <li>- <i>Ben is easy to talk to and easy to get along. (Javon)</i></li> <li>- <i>Very flexible and open to everyone's contributions and a fun person to have in the group.(Martin)</i></li> </ul>   |
| Strategic Support                                 | Share notes, study group before test, guide how to learn, teach group members                                      | <ul style="list-style-type: none"> <li>- <i>Amazing attitude helped the study sessions flow smoothly; helped work out study times and was very earnest when making up missed study sessions. (Alejandro)</i></li> <li>- <i>Jenny pushes for the group to work quickly and effectively. (Michael)</i></li> <li>- <i>Sebastian provides study guides for group prior to tests. (Charlie)</i></li> </ul> |
| Supportive (Vague)                                |  | <ul style="list-style-type: none"> <li>- <i>Wonderful person and bright individual.(Rosemary)</i></li> </ul>  |
| <b>Categories For Negative Perspectives (N=9)</b> | <b>Descriptions</b>  | <b>Quotes</b>   |
| Lack of Communication Channels                    | No response from email, text, or phone   | <ul style="list-style-type: none"> <li>- <i>There have been some communication issues due to her inability to read the group text or respond to communication. (Catherine)</i></li> <li>- <i>She does not respond via email. (Chantalle)</i></li> </ul>   |
| Lack of Individual Accountability                 | Did not do their fair share, contribution, participation, class attendance, motivated                              | <ul style="list-style-type: none"> <li>- <i>I totally understand if you can't make it to class, but a little heads up would be nice so that I wouldn't constantly look around for you. (Allys)</i></li> <li>- <i>Next time you are going to miss a class, please let us know so that we aren't waiting for you to show up. (Patricia)</i></li> </ul>  |
| Lack of Learning Support                          | Exhibit lack of knowledge  | <ul style="list-style-type: none"> <li>- <i>it feels as though he doesn't always know what is going on and may not be focused on the task at hand. (Cemella)</i></li> <li>- <i>Does not always know the material very well. (Farrel)</i></li> <li>- <i>Sebastian may need to study a little more for the next test. (Rohan)</i></li> </ul>  |
| Lack of Positive Interdependence                  | Lack of Care and concern of group members for one another  | <ul style="list-style-type: none"> <li>- <i>Jamie is truly a hard worker, but that sometimes can be perceived as her being a little bossy at times (Ava)</i></li> </ul>   |
| Lack of Procedural Support                        | Inability on providing operational steps that are not integrally connected to cognitive activities, decision maker | <ul style="list-style-type: none"> <li>- <i>Siana is not a very good writer.</i></li> </ul>   |
| Lack of Social/Interpersonal Communication Skills | Inability to interact and communicate with group members   | <ul style="list-style-type: none"> <li>- <i>Don't be afraid to speak up. (Anna)</i></li> <li>- <i>You should share your thoughts a little bit more because your input is valued. (Dana)</i></li> </ul>  |
| Lack of Strategic Support                         | Not willing to   | -Not emerged-   |

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|  | Share notes, guide how to learn, teach group members |   |
| No Emotional Support                       | Lack of providing positive vibe, energy              | <i>-Not emerged-</i>  |
| No Role Recognition                        | Not completing assigned group member's role          | <i>-Not emerged-</i>  |
| <b>Neither Positive Nor Negative (N=2)</b> | <b>Descriptions</b>                                  | <b>Quotes</b>   |
| Irrelevant Comment                         | Filler Words Only                                    | <i>Okay, so apparently, I keep leaving too short of a feedback, even though it's over 10 words, so I'm putting this here so I can go on with my life.</i> |
| No Comment                                 | Did Not Leave any Comment                            | <i>(no comment)</i>   |