Below are sample questions that I wrote for the "Group Readiness Assessment" (GRA) for the Public Health Impacts of Climate Change course at the Mailman School of Public Health. The course has weekly individual and group quizzes based on lecture and reading from the week, and the group quiz (GRA) is a repeat of the individual quiz (multiple choice) plus an additional short answer question that is intended to test a higher level of mastery of the material.

For these questions, I decided to adopt a theme throughout the semester for students to feel a stronger connection of the course material. The questions include both closed-ended and open-ended questions, designed to both test basic understanding and generate group discussion. In general, grades on the GRAs are always higher than the corresponding individual quizzes. Furthermore, groups all provide thoughtful answers to the short answer GRA questions that clearly demonstrate mastery of the material. To me, this is another example that clearly illustrates the benefits of focusing on group work.

Public Health Impacts of Climate Change - P8304, Spring 2019
Sample GRA Questions

Week 1: Your group is testifying before a group of senators skeptical about climate change, and one of them asks "What the heck is climate anyways? Can we feel it?" List at least three components that go into describing climate. Can we perceive climate? Defend your answer in a short paragraph (4-5 sentences).

Week 2: After testifying before the group of skeptical senators, you run into one of them in the elevator afterwards. Unfortunately, the elevator breaks down (manufactured by the same company that made the old elevators at the 168th Street Station). You decide to use this opportunity to further educate the senator about climate change. Provide a brief description on the science behind how global warming works. Be sure to include (i) the three scientific "laws" that govern energy/radiation, (ii) how the greenhouse effect works, (iii) potential sources of uncertainty. (6-8 sentences; 3 points)

Week 3: After spending an hour of quality time with your favorite skeptical senator in the elevator in which you thoroughly informed him about the science of global warming, he seems to have a change of heart. He asks, "So is there any way we can find out what's gonna happen to our planet under global warming?" You decide to further educate the senator about climate modeling. In words that the senator can understand, provide a qualitative description of what climate models are, including: (i) three basic facts about climate models in general, (ii) what downscaling is and why we need it, (iii) a list of pros and cons for both statistical and dynamical downscaling. (6-8 sentences; 3 points)

Week 4/5: Your favorite skeptical senator was able to get you an extra ticket to attend the 2019 State of the Union Address. During the speech, you were slightly bothered by the comment made by the president regarding "ending the war on beautiful clean coal". You approach the senator again after the speech and ask him for his opinion, to which he responds, "What's wrong with coal? Is it bad for health or something? How can we prove it?"

In the context of epidemiologic studies, list three study designs that you can utilize to investigate the health effects of coal. Choose one that you think would work best, and defend your choice with the strengths of the study design. List three potential confounders that you may need to control for in your study. (6-8 sentences; 3 points)

Week 6: Senator Skeptical has become concerned with the recent "unseasonably warm weather and unusually warm temperatures" emails sent out by the Capitol Building Superintendent's Office (yes, this is a real thing that is the equivalent of CUMC Facilities Management). As he is sweating uncontrollably in his office, he begins to ponder what might happen to him if the heatwave keeps up. Identify (i) three forms of physiological responses to heat by the human body, (ii) three vulnerability factors that can aggravate heat effects, and (iii) three solutions that can potentially mitigate the effect of extreme heat. (4-6 sentences, 3 points)

Week 7/8: Senator Skeptical has recently been appointed the chair of the Senate Committee on Environment and Public Works. To brush up on his environmental knowledge, he starts reading Wikipedia articles, and comes across these "climate model thingys" on the Internet. To help the senator become more informed, list three components of a global climate model and three physical processes that global climate models simulate. In a couple of sentences, explain why studying past climates is useful. (3 points)