1. We need to survey a random sample of the 300 passengers on a flight from Los Angeles to New York. Name each method described below:
   a. Pick every 10\textsuperscript{th} passenger as people board the plane.
      Systematic sampling
   b. From the boarding list, randomly select 5 people flying first class and 25 of the other passengers.
      Stratified sampling
   c. Randomly pick 30 seat numbers, and survey the passengers who sit there.
      SRS
   d. Randomly select a seat position (right window, right center, right aisle, etc.) and survey all the passengers sitting in those seats.
      Cluster sampling

2. You are trying to find out what freshmen think of the food served on campus, and have thought of a variety of sampling methods, all time-consuming.
   a. A friend suggests that you simply set up a “Tell Us What You Think” website to visit the site to complete a questionnaire. What is wrong with this idea?
      That would be a voluntary sample, which would be most certainly biased.
   b. Another friend suggest that you just stand outside of Sierra Center at lunchtime and stop people to ask them questions. What is wrong with this idea?
      That would be a convenience sample, which again would be most certainly biased.

3. In a large city school system with 20 elementary schools, the school board is considering the adoption of a new policy that would require elementary students to pass a test in order to be promoted to the next grade. The PTA wants to find out whether parents agree with this plan.
   Listed below are some ideas proposed for gathering data. For each, indicate what kind of sampling strategy is involved and what (if any) biases might result.
   a. Put a big ad in the newspaper asking people to log their opinions on the PTA website.
      Voluntary sample. Only those who both see the ad and feel strongly enough will respond.
   b. Randomly select one of the elementary schools and contact a parent for each student in the school.
      Cluster sample. One school may not be typical at all.
   c. Send a survey home with every student, and ask parents to fill it out and return it the next day.
      Attempted census. Will have nonresponse bias.
   d. Randomly select 20 parents from each elementary school. Send them a survey, and follow up with a phone call if they do not return the survey within a week.
      Stratified sampling with follow-up. Should be unbiased.
   e. Run a poll on the local TV news, asking people to dial one of two phone numbers to indicate whether they favor or oppose the plan.
      Voluntary sample. Only those who see the show and feel strongly will call.
f. Hold a PTA meeting at each of the 20 elementary schools, and tally the opinions expressed by those who attend the meetings.
   - Possibly more representative than the previous part, but only strongly motivated parents go to PTA meetings.

g. Randomly select one class at each elementary school and contact each of those parents.
   - Multistage sampling, with cluster sample within each school. Probably a good design if most of the parents in the class respond.

h. Go through the district’s enrollment records, selecting every 40th parent. PTA volunteers will go to those homes to interview the people chosen.
   - Systematic sampling. Probably a reasonable design.

4. For the situation described in #3, two members of the PTA committee proposed different questions to ask in seeking parents’ opinions:
   Question 1: Should elementary school-age children have to pass high-stakes tests in order to remain with their classmates?
   Question 2: Should schools and students be held accountable for meeting yearly learning goals by testing students before they advance to the next grade?

   a. Do you think responses to these two questions might differ? How? What kind of bias is this?
       - Answers will definitely differ. Question 1 will probably get many “No” answers, while Question 2 will get many “Yes” answers. This is wording bias.

   b. Propose a question with more neutral wording that might better assess parental opinion.
       - Something like this: “Do you think standardized tests are appropriate for deciding whether a student should be promoted to the next grade?”