**Authors’ Note 1: Supporting the Design Process**

While students are challenged to approach the engineering task as problem-solvers, that does not imply that the teacher's role is passive. The teacher can help students to articulate the limitations of their designs, generate alternatives, and identify shortcomings. By using questions and prompts, students remain in the driver's seat as problem-solvers, but also benefit from feedback. The following prompts were used to support, scaffold, and guide students.

* I see that you've . . . what's your thinking behind that approach?
* What kinds of problems have you encountered trying that?
* What ideas haven't worked?
* Have you tried/considered . . .?
* Another group experienced similar challenges. Why don't you go check out what they're trying.
* Can you think of something else that has a similar function to what you're trying to design? How does that work? Might something similar work here?

Management Tips

• Iterations take time. Student need latitude to go down a dead-end or two. Plan accordingly.

• Iterations are more productive with frequent and ongoing feedback. Plan for short iteration sessions (10-20 minutes). A timer displaying the time remaining can be projected to help students manage their time. In between these sessions, structure discussions that allows students to articulate their reflections and that allow the teacher to play skeptic, ask leading questions, and highlight important discoveries of different groups.

• It can be useful to have student work overlap more than one class period. This allows the teacher to review the work that students have done in one iteration and plan structured feedback for the next one. (i.e. "Let's start by taking a look at this group's work . . . "Yesterday, most groups said . . . but here's some evidence to the contrary.")

• It may be useful to have available illustrations or models of the human heart that clearly show the structure of the mitral valve during the engineering potion of this lesson.

• Many students first design single-flap trap-doors to solve this problem. Close inspection of heart valves show that they are not simple trap-doors. It may be useful to ask students to consider how their designs differ from actual heart valves and what advantages a more heart-like valve would have.