

# 5 Use the problem-solving approach to do the Pipeline Challenge

1. **Establish Systems Engineering Operation/Challenge.** You are part of a team of engineers which has to develop a pipeline system. You are going to build a model that will transport a golf ball and a ping pong ball at least 20 feet. You must incorporate the following design elements:

- include least 4 angles, one of which is a 90° angle
- the difference in height from one end of your pipeline to the other can be no more than 18 inches
- incorporate at least one environmental challenge (i.e., pretend that you are going over a culvert, around a hill or under a waterfall, for example)

2. **Describe the project requirements.** List your constraints here:

3. **Plan the activities with timelines.** What tasks need to be done and in what order?

4. **Conduct Research—get ideas.** consider an alternative location to build your pipeline to incorporate the required environmental challenge (i.e., outside around a bush or over a ditch or sidewalk). List your ideas here:

5. **Develop and Analyze the best idea/alternative solutions.** List your top 3 ideas here:

6. Select the best idea and draw a plan here:

7. Get your pipes to make your pipeline. Create the pipeline and test. Report your results here:

8. Check the solution and redesign as necessary. What adjustments did you make?

9. Take a video of your pipeline and share it.