

5.1 TRANSPORTING NATURAL GAS

How do engineers develop pipeline systems to transport crude oil, water, natural gas and other materials over long distances?

MATERIALS

Per small group of students:

- Two 10-foot lengths of 2-inch PVC pipe cut into the following lengths:
 - 5-foot (1 piece)
 - 4-foot (2 pieces)
 - 3-foot (1 piece)
 - 2-foot (1 piece)
 - 1-foot (2 pieces)
- 3 different kinds of fittings totaling 7 pieces:
 - one 2-inch fitting with 90° elbow
 - four 2-inch fittings with slight elbow
 - two 2-inch short fittings
- Tape measure
- One Ping-Pong ball or light-weight foam ball
- One golf ball

DIRECTIONS

1. Give an overview of the **Engineering Design Model** to address this challenge:
You are part of a team of engineers which has to develop a pipeline system to transport a golf ball (representing crude oil) and a Ping-Pong ball (representing natural gas) at least 20 feet. You must incorporate at least 4 angles in your design, one of which is a 90° angle, the difference in height from one end of your pipe to the other can be no more than 18 inches and you must incorporate at least one environmental challenge (i.e., over a culvert, around a hill, under a waterfall) in your design.
2. **Ask** what are the constraints and what supplies do we have?
3. **Imagine** the possibilities.
What do we know about pipelines?
4. **Plan** different tests we should try.
Draw some possibilities.
5. **Create** and test the prototype. Take a photo/video to share with others.
6. What changes can you make to **improve** your design?

