PRODUCTION ACTIVITY

Getting the Oil Out

Activity courtesy of SPE

Artificial lifting systems, or pumping units, are used to help pull the oil out of the reservoir rock and pump it up the well. A down hole pump in the well is connected to the pumping unit by steel rods, which are screwed together. The pump is activated from the up and down movement of the pumping unit on the surface. As the pump plunges down, fluid from the rock formation flows into the pump chamber. On the upstroke, the fluid in the chamber is forced up the tubing, to the surface.

Question

- Will it be easier to bring up liquid with a long straw system, or a short straw system?

Materials *FOR EACH STUDENT OR PAIR*

- 8-10 Drinking straws
- Masking tape
- Scissors
- Ruler
- Carton of chocolate milk or other beverage

(Preferably a dark color so it can be seen through the straw)

☑ Procedure

1. Using the scissors, cut a 1 cm slit at one end of each straw.
2. Join the straws end to end to form one long tube. Place the slit end of the straw into the inside of the adjoining straw.
3. Place masking tape over each connected end to secure the joint and create an air tight seal.
4. Place the carton of chocolate milk (or other beverage) on the floor. One member of the group stands on a chair and inserts the extended straw "tubing" into the beverage trying to bring the liquid to the top of the "tubing" using his/her suction.
5. Now, decrease the number of straws used for the "tubing" by cutting off one straw. The same student tries to bring the liquid to the top.
6. Continue cutting off one straw at a time. After each cut try to bring the liquid to the top of the tubing.

Conclusions

- Which length of straw required the most effort to bring the liquid to the top? Which length of straw required the least effort to bring the liquid to the top? Explain why.

Extensions

- Try to pull up liquids of different viscosities and densities.
- Try using straws of different diameters to make your tubing.
- Study the diagram of the artificial lift system. Use the diagram to estimate how the system works to retrieve oil. Record your thinking in your science notebook. Using the *Oil and Natural Gas* book or internet sources, perform research to see how a horsehead pump actually works.