Drinking Straw Pressure Drop

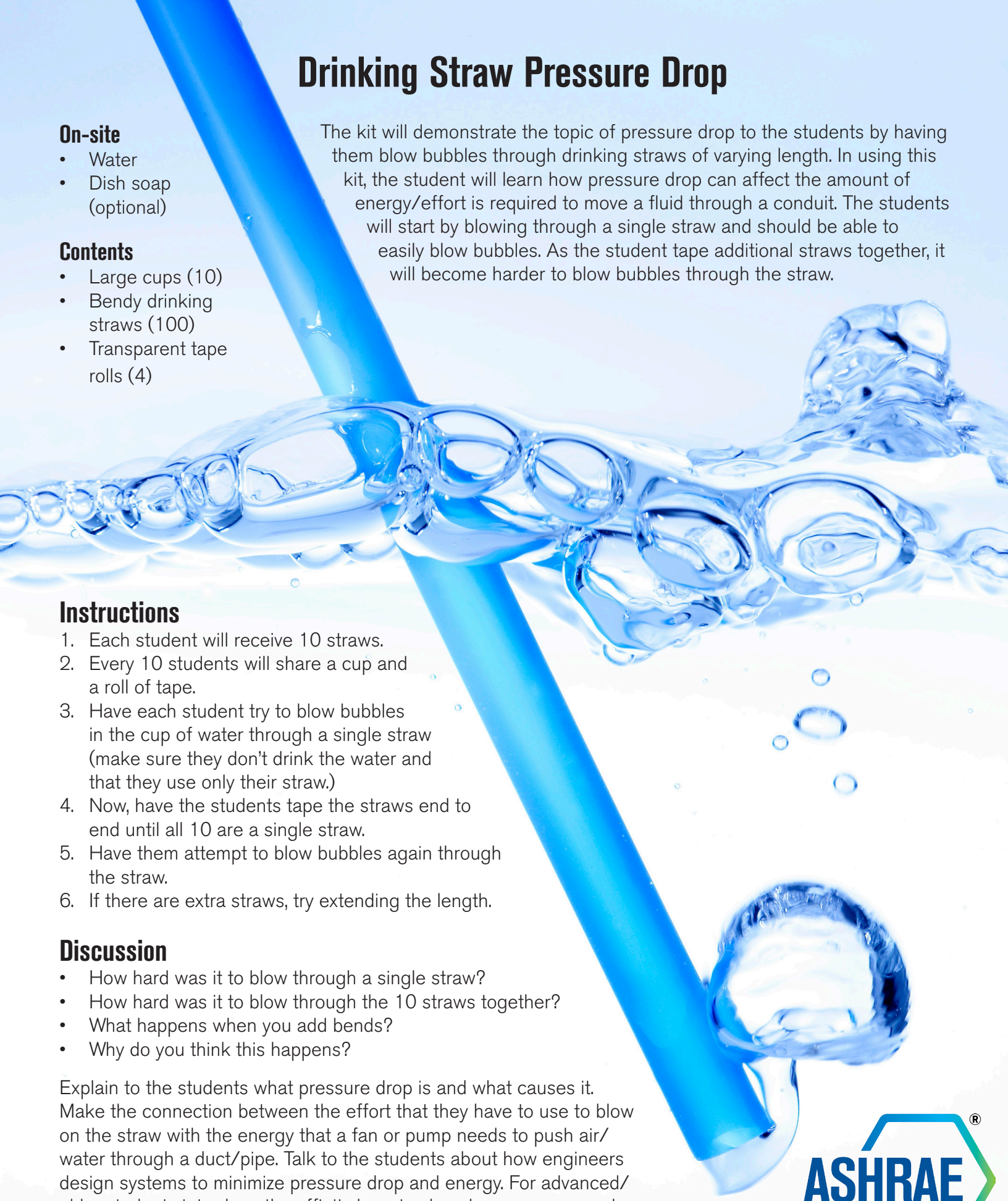
The kit will demonstrate the topic of pressure drop to the students by having them blow bubbles through drinking straws of varying length. In using this kit, the student will learn how pressure drop can affect the amount of energy/effort is required to move a fluid through a conduit. The students will start by blowing through a single straw and should be able to easily blow bubbles. As the student tape additional straws together, it will become harder to blow bubbles through the straw.

On-site

- Water
- Dish soap (optional)

Contents

- Large cups (10)
- Bendy drinking straws (100)
- Transparent tape rolls (4)



Instructions

1. Each student will receive 10 straws.
2. Every 10 students will share a cup and a roll of tape.
3. Have each student try to blow bubbles in the cup of water through a single straw (make sure they don't drink the water and that they use only their straw.)
4. Now, have the students tape the straws end to end until all 10 are a single straw.
5. Have them attempt to blow bubbles again through the straw.
6. If there are extra straws, try extending the length.

Discussion

- How hard was it to blow through a single straw?
- How hard was it to blow through the 10 straws together?
- What happens when you add bends?
- Why do you think this happens?

Explain to the students what pressure drop is and what causes it. Make the connection between the effort that they have to use to blow on the straw with the energy that a fan or pump needs to push air/water through a duct/pipe. Talk to the students about how engineers design systems to minimize pressure drop and energy. For advanced/older students introduce the affinity laws to show how pressure and energy savings are related.

ASHRAE®