15.5: Thinking about the material

End of chapter activities:

Reflect and research

1. Does atmospheric pressure increase or decrease when the weather is nice? How come?
2. How does water move from the roots of a tree to the top, for a very tall tree?
3. When did Bernoulli describe the motion of fluids?
4. Where did Bernoulli come from?

To try at home

1. Place your hand in a plastic bag, and immerse your hand with the bag in water. The deeper the column of water, the better. Describe what you feel on your hand in terms of the direction of the force exerted by the water pressure.
2. If you assume that the water that comes out of your bathroom faucet is gravity-fed from a water tank, determine the height of the corresponding water tower relative to your bathroom faucet. Measure the flow rate of water from the faucet to determine the height and discuss whether it makes sense.
3. Try plugging the faucet in your bathroom tap with your thumb. Are you able to completely prevent water from coming out when the tap is open? Estimate the pressure of the water in the pipes leading to your bathroom faucet.
4. In your house/building, measure the flow rate between similar faucets at different heights, and compare with what one would expect from the model from *Example 15.3.3*.

To try in the lab

1. Propose an experiment to build a barometer and track the changes in atmospheric pressure as a function of time, and to compare your measurements to those from a weather station.
2. Propose an experiment to characterize how liquid flows in a sponge. Is there a maximum height to which a sponge can draw liquid? How is energy conserved if water is drawn upwards in a sponge?
3. Propose an experiment to measure the resistance of a pipe to the flow of water and compare with the result expected from Poiseuille's equation.
4. Propose an experiment to determiner the viscosity of maple syrup.
5. Propose an experiment to model the water flow in the sections of a cascading fountain.
6. Investigate the flow of water in a spinning bowl.
7. Investigate and model how the pressure in a balloon changes as the balloon increases in volume.
8. Investigate and model the surface tension of water.
9. Design and build a blood pressure monitor using a manometer.