SIPHONS AND CLIMATE CHANGE

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Siphons are pumps with no moving parts that can transport water from a higher to lower level. The principles of operation of a siphon can easily be demonstrated in the classroom using only two containers and transparent flexible tubing. Due to climate change many areas of the world experience alternating extreme flooding and drought. Siphons are useful for transporting water for drinking and agriculture. The image below shows a member of a remote village in the Solomon Islands with water obtained from a mountain spring using a siphon (Hughes et al., 2021), an example of water being transported from a mountain spring to a remote village in the Solomon Islands. An advantage of using a siphon in these situations is that no energy is required beyond gravity. Siphons can also be very useful in draining flood waters where no power is available to run conventional pumps. The main proviso is that there must be an area lower than the flooded zone where water can be safely drained.

In the classroom it is easy to teach students the basics of the operation of a siphon. There are four main factors that affect siphon flow: height, diameter, length, and viscosity. The height is the height difference between the water level in the upper and lower reservoirs, or between the upper reservoir level and outlet of the siphon. The effect of height can be demonstrated by getting a siphon flowing and then raising and lowering the exit above and below a bucket. When the outlet is raised, flow slows. When the outlet is lowered flow increases. Flow increases with tube diameter and decreases with tube length. Flow also reduces with water temperature due to an increase in viscosity. Siphon experiments can be made quantitative by collecting water in a container and weighing using a kitchen balance. The scale of the experiment is small enough to be performed online and for online students to do at home.

REFERENCE

Hughes, S. Beard, L, S, & Platten, B. (2021). Using a siphon to supply spring water to a remote village. *Physics Education, 56,* 055037. https://doi.org/10.1088/1361-6552/ac1655

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