

Domain: Water supply

Age group: 8-14 years

Subjects: Water quality, water treatment, parts of human body, personal hygiene related ailments

3.6 Filtering the flow

Learning goals:

Knowledge:

- Children can outline environmental factors that result in unsafe drinking water.
- They can explain how water can be purified.
- They can indicate (and older children can explain) the relative effectiveness of the different methods.

Attitude:

- They appreciate good water quality and reject water from an unprotected source for drinking and preparing food, particularly uncooked food.
- They want to protect water sources and treat drinking water.

Practical skills:

- They can demonstrate different purification techniques.

Psychosocial life skills:

- They understand the importance of consuming clean water for health.
- They appreciate the implications of how gender and poverty issues can influence water purification and can contribute to reducing inequalities.

Participatory methods:

- Demonstration
- Plenary discussion

Materials:

A clean, white cloth, a clean plastic bottle, a knife, a small piece of wire mesh, coarse pebbles, coarse sand and fine sand, a transparent container, a jar with water which is muddy and contains parts of vegetation and possibly insects

Activities:

Filtration to demonstrate dirt

- Ask some students to take a clean white cloth and show it to the class.
- Ask them to place the cloth over an empty container and tie it firmly around the opening.
- Explain to the class where the water comes from. Ask the students to pour it through the cloth. Ask them to describe what they see on the cloth.
- Ask them to loosen the cloth and hold it, and the container, up against the light for the class to see. Ask the other students to describe what they see and to discuss what may, and may not be retained by the cloth.

Filtration for purifying water

- Make a sand filter in advance for the younger children or help older children to make their own sand filter.

- Cut the bottom off a clean and clear plastic bottle. Cut out a circle of fine mesh to make a wire screen large enough to block off the neck of the bottle. Put the screen inside the bottle so that it is firmly lodged halfway down its neck.
- Put a layer of coarse pebbles on top of the screen, then a layer of coarse sand, and finally a layer of fine sand. Pour some dirty water into the bottle and let it soak through.
- Ask the children to observe the colour of the water that drops into the bottle.
- Explain that the sand traps germs, but that over time it gets clogged by the particles of dirt. It needs to be taken out of the filter and cleaned or replaced every few weeks. Replace it when the water trickles more slowly or stops flowing altogether.

Purification using ultraviolet rays

- Get a transparent bottle and fill it with muddied, dirty water and close the container.
- Lay the bottle horizontally in strong sunlight on a flat surface, preferably black in colour (e.g. a piece of black plastic). After five hours in strong sunlight the water is safe to drink, because the ultraviolet rays destroy the micro-organisms that cause illness.

Application:

- Ask the children to discuss which of the different ways of cleaning water they found easiest to use. Ask them if they know other methods to purify water and how water is made 'safe and clean' in their homes.
- Ask them to explain each method orally or in writing and to identify which methods are safer and which are less safe or unsafe. Younger children can make three piles (safe, less safe and unsafe). Ask older children to do a full ranking.
- Ask them to explain why some methods are safe and others not.
 - Boiling, if done for at least ten minutes but if possible 20, is safest.
 - This is followed by slow sand filtration, chlorination and solar disinfection. Boiling, chlorine and strong sunlight all kill bacteria. Slow sand filters form killer bacteria which 'attack and eat' other bacteria that are harmful to health.
 - Filtering through a cloth is least safe. The cloth filters the large bits of dirt, but does not attack and kill bacteria. Some are small enough to slip through the threads of the cloth. To illustrate this, draw a diagram of a woven cloth.
 - Alum and certain seeds clarify water but do not kill bacteria.
 - Water directly from an unsafe source is totally unsafe.
- Discuss which practices make a water source unsafe to use for drinking. Discuss how these practices can be changed.
- Discuss what work is required for each method of purification. Who will do this work? Who may have problems and why? What can be done?

Learning indicators:

- Children can mention how water in water sources can get contaminated and what may happen as a result (see also 3.5 Wash and Drain).
- They can mention different methods of making water cleaner and safe/safer to drink.
- They can explain which methods are safer or less safe and why.
- They are aware of constraints that some households may face in drinking safe water and can suggest problem solving actions.

Competence:

Purifying water for drinking