**Water Treatment**

**Drinking Water Filter – Teacher Guide and Answer Key**

**Safety**

Students must **not** drink the water.

Students must wear goggles at all times.

Students must wash their hands after the activity.

Use regular chlorine bleach (sodium hypochlorite) **not** the new oxidizing bleaches.

Do NOT keep bleach at school; take a small amount from home to school.

Dilute the bleach yourself. Do not let students do this.

The dropper bottles must be well labelled with **50 mL bleach in 50 mL water, your name and the date mixed**.

Diluted bleach is safe for intermediate students to use.

Empty the chlorine dropper bottle(s) before storing equipment for the next year. This can be put down the drain.

NEVER use ammonia instead of chlorine bleach.

**Other Notes**

This activity is best done outside in the schoolyard so you don’t have to worry about cleaning up the mess. The cheap heavy brown paper towel often used by schools is best or use regular paper towel folded in half to make it a bit stronger.

**Clean up**

A sieve is helpful to separate the sand and gravel. Place the sieve above the sand bucket and then students dump the leftover gravel from the sieve into the gravel bucket.

Pour all dirty water back on plants. Use this bucket to collect the treated “clean” water and pour it down a drain. Do **not** pour the treated “clean” water back on plants as the alum and chlorine could harm them. Be absolutely sure everything is left to air dry before storing. The sand is especially hard to dry and must be stirred for a few days or poured onto a towel and left to air dry.

**Answer Key**

**Minds On:**

1. What are three human activities that require safe, clean water?

*Drinking, cooking, bathing. Note the Ontario Safe Water Drinking Act requires zero E. Coli bacteria colonies in tap water. Lake water can have up to 100 E. Coli colonies and be safe for swimming and boating.*

2. Lake water is a mixture. What substances have to be removed from lake or river water to make it safe to drink?

*Bacteria, dirt, plastic, viruses, aquatic animals, plants and many other correct answers.*

3. What substances can be used to make water safe to drink?

*Chlorine to kill microorganisms like bacteria and viruses. Iodine is another possible correct answer. Students who have a cottage might mention ultraviolet light which also kills microorganisms. Fluoride does* ***not*** *make water safe to drink (it is added to prevent dental cavities) nor does activated carbon (charcoal) which is used in commercial water filters to remove odours.*

**Materials**

*1 L empty plastic bottle*

*Paper towel*

*1 cup sand*

*1 cup gravel*

*Elastic band*

*Cheesecloth*

*Dirty water*

*Alum*

*Spoon*

*2 cups*

*Chlorine drops*

*Goggles*

*scissors*

Diagram labels:

*Title, bottle, sand, gravel, paper towel, cheesecloth, elastic, dirty water, cup with clean water*

**Observations:**

|  |  |
| --- | --- |
| **Type of Water** | **Observations** |
| Dirty Water | *1. Murky, not clear*  *2. Smells like dirt*  *3. Brown colour*  *4. has leaves, twig, pieces of grass floating in it* |
| Dirty Water with alum | *1. still brown but has some bigger clumps of dirt and may be less murky* |
| Clean Water | *1. Clearer*  *2. smells like bleach*  *3. Nothing floating, still some brown colour* |