

# AS8 - Journey Down The Drain

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This activity involves an investigation into waste water and its treatment.

## Teacher Background

This activity can be set as a do at home activity. It engages students in thinking about sewage and its treatment. A mixture is prepared to represent sewage and then students use a variety of techniques to separate different components from the mixture.

Estimated lesson time: 40 minutes over two days (additional follow up time for growing plants)

## Syllabus references

**Core content:** 5.11.2 waste from resource use to:

a) relate pollution to contamination by unwanted substances

**Skills:** 5.13.2 Plan first hand experiences to

c) describe a logical procedure for undertaking a simple or controlled experiment

## You will need

To create your own wastewater mix you will need the following equipment:

|                  |                |                 |
|------------------|----------------|-----------------|
| A jar with a lid | Plastic bag    | Grass clippings |
| Cooking oil      | Fly screen     | Fertiliser      |
| Liquid soap      | Blotting paper | Sticks          |
| Soil             | Eye dropper    | Toilet paper    |
| Sand             | Filter paper   | Cotton wool     |
| Vinegar          | Disinfectant   |                 |

## Background

Every time you wash your hands, flush the toilet or wash your clothes, you're creating wastewater. Think of how much wastewater comes out of your own home. Then consider all the houses in your street, your suburb, and your city. Then consider all the industries, shops and farms. Suddenly we have got a lot of wastewater to treat and, as the population grows, so does the amount of wastewater. Indeed, in many places around Australia, water authorities are struggling to keep up with the amount of wastewater being generated by the community.

Clearly, sewage needs to be treated first to remove the useful components and harmful substances. How would you go about treating it?

## What to do

Make the mixture:

Place clean water in a jar.

Add a teaspoon of the following: Cooking oil, liquid soap, soil, sand, grass clippings and fertiliser. Add a few small sticks, 3 squares of toilet paper, shredded plastic, and some food scraps.

Attach the lid firmly onto the jar and shake the mix vigorously for several minutes. The result isn't all that pleasant; imagine what it would be like if you added all the things you flush down the toilet plus chemicals from factories which go down the drains.

#### Make a plan

Before going any further think about how you'd separate your wastewater mix. Write down a plan for separating the mixture, using the equipment from the list.

#### Try your plan out

Implement your plan for separating out the "sewage mixture". Write a brief report about what you did and the outcome of your investigation.

#### Or try this way

Let your mixture sit for a couple of minutes. Some materials should settle to the bottom, some will float on the surface.

Filter the wastewater mix through a fly screen into a bowl. If you're careful the sludge that settles at the bottom will stay in the jar and the larger floating objects will be caught in the screen.

Remove the oil scum from the bowl by drawing it off with blotting paper or an eyedropper. Filter the remaining mix through filter paper or cotton. By now you should have removed all but the finest particles and the material that has dissolved in the water.

Mix in some vinegar. This changes the acidity of your mix and causes some of the fine clay particles to clump together and settle out.

Try growing some water plants on the remaining mix so the fertiliser (which represents unwanted nutrients and minerals in wastewater) is used up.

Write a report to describe what happened.