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| outhern River College | Year 11 Earth and Environmental Science  **Task 9: Simulating wastewater treatment** |

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| **Name:**  **Due Date:** Week 2 Term 4 | **Teacher:** | **Score: / 52** |

Treatment processes for wastewater can be categorised as physical (**primary**), chemical (**Secondary**) and biological (**tertiary**). Physical treatment removes solids,; chemical treatment is used to target dissolved substances for physical removal, and in biological treatment organisms are used to absorb pollutants too small to filter.

In this investigation you will model physical and chemical treatment of wastewater using simulated wastewater.

**PRELAB**

Describe what is meant by filtrate (2 marks)

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Describe what is meant by residue (2 marks)

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Describe what is meant by sedimentation (2 marks)

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Describe what is meant by decantation? (2 marks)

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**AIM**

Write an appropriate aim for this investigation (1 mark)

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**MATERIALS**

- 200 mL simulated wastewater

- Sieve

- 250 mL beaker

- Filter paper

- Filter funnel

- 250 mL conical flask

- Washing soda (sodium carbonate)

- Silver nitrate solution (0.1 M)

- 2 Test tubes

- Safety glasses and disposable gloves

**METHOD**

1. Stir wastewater mixture to ensure that all components are well mixed. Photograph the initial wastewater.

2. Place the sieve on top of a 250 mL baker and carefully pour 200 mL of wastewater through the screen. Record substances removed from this step and appearance of the wastewater. Take a photograph of this step.

3. Place the filter paper in the filter funnel and set this on the neck of the conical flask.

4. Pour water from step 2 into the funnel to nearly fill it.

5. Record observations of the filrate and residue. Retain the filtrate for part C/ Photograph the stage of water

6. Set the wastewater remaining in beaker aside overnight for part D

7. Pour the filtrate from part B into a test tube and test for salt by addind two drops of silver nitrate solution. A milky colour indicates that salt is present. Record your observations in this step

8. Empty the test tube with silver nitrate into a labelled waste container. Place all solid waste in a bin bag and was other liquid waste down the sink.

9. Record observations of sedimentation in the wastewater remaining in the beaker. Take a photograph as your result

10. Place a pea-sized amount of washing soda into a test tube, adding water to half-fill the tube and dissolve the washing soda.

11. Decant water from the sedimentation beacker into the the test tube containing the washing soda. Record your observations and photograph

12. Leave the test tube with washing soda overnight for sedimentation. Observe the result.

**Risk Assessment**

Research the risks of conducting this investigation. (4 marks)

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| What are the risks in conducting this investigation? | How can you manage this to stay safe? |
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**RESULTS**

Complete the following table for results and attach any images you have taken from the experiment  
 (24 marks)

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| **PROCESS** | Appearance of water before treatment | Appearance of water after treatment | What was removed? |
| Screening |  |  |  |
| Filtration |  |  |  |
| Sedimentation |  |  |  |
| Precipitation |  |  |  |

**DISCUSSION**

1. State which type of substances in real wastewater might be removed by each process that you modelled (4 marks)

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2. Why might you need a chemical process such as precipitation to treat wastewater? (3 marks)

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3. Is another water treatment process required after precipitation? Explain why or why not (hint think back to what has been covered in class) (4 marks)

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**PHOTOS** (4 marks)

Attach any photos gathered here