



Muddy Waters

Subject: Science Context: Filtration	Year Group: Year 6	Date:
Knowledge, Skills and Understanding: This activity investigates filtration, making filters. Describing how mud mixes with the water and predicting how different objects will perform by investigating their physical properties.		
Learning Objectives (Choose from): • Asking relevant questions and using different types of scientific enquiries to answer them. • Setting up simple practical enquiries, comparative and fair tests. • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Identifying differences, similarities or changes related to simple scientific ideas and processes. • Using straightforward scientific evidence to answer questions or to support their findings. • Compare and group materials together, according to whether they are solids, liquids or gases. • Recognise that soils are made from rocks and organic matter.		
Lesson Overview: Soil and salt or sugar is mixed with water and poured down the gutters, a selection of filters are made and added to the gutter run to filter out the particulates in the water: performing simple tests and classifying and recording results by asking questions and solving practical problems.	Resources: • Moti-Lab reservoir • Moti-Lab board • Moti-Lab gutters • A bucket or large container • 1l measuring jugs • Soil • Gravel • Sand • Mesh of different sizes • Coffee filter papers	



Activity:

- Weight the contaminants you are going to add to the water.
- Take 1000 ml of water and mix in the soil and other contaminants.
- Explore how soil behaves when it is mixed in the water.
- Discuss how the water changes colour, and any other changes to its properties.
- Take the filter funnels and make filters using the mesh, gravel, and coffee paper.
- Talk about the contents of the funnel and order them into biggest holes to smallest holes.
- Make a steepish gutter run with gaps for each of the filters.
- Add the filters to the gutter run with in order of largest hole to smallest holes by holding them in place.
- Pour 800ml of the 1000ml down the gutters (keep 200ml for reference).
- Collect 200ml after the water has gone through the first filter.
- Pour the remaining 600ml down the gutter and allow it to pass through the next filter.
- Repeat for the other 2 filters keeping 200ml for reference each time.
- Compare all the samples of both water and what is left in the filters.
- Record and discuss any differences.
- Where you right in your predictions?
- Do the filter samples show that larger objects are collected by the gravel and finer sediment by the filter paper etc.
- Collect the contaminants on the filters and weigh them.
- do they add up to the original weight? Is it more or less? Why?

Conclusion / Plenary:

- Understanding which objects filter muddy water.
- Understanding the relationship between the size of the holes in the filter and the sediment collected.

Cross Curricular Links (Choose from):

Maths

- Measuring intervals of 200ml or fifths.

Statistics

- Interpret and present discrete and continuous data using appropriate graphical methods.

English

- Describe observations using full sentences, in speech and in writing.

- Clear cups or beakers
- Measuring jugs
- Plastic filter funnels
- Digital Weighing scales

Key Vocabulary:

water, mud, dirty, clear, filter, colour, solid, liquid, property, porous, flow, sink, float, faster, slower, pour, fill, container, soil, mud, metal, wood, evaporation, litres, millilitres, record, plot.

Challenge Questions (Choose from):

Does the amount of liquid change before and after the experiment? by how much?

How do the results compare with your predictions?

Can you describe what soil is made up of?

What do we need to take out of the water to make it clean again?

Is there less or more dirt in the container after each experiment?

How can you measure how much dirt is in the water?

Can you group together objects by filtration?

Can you think of other objects that may be better at filtering the water?

Does the water run past the object or go through it?



Complementary Activities

- Leave a container of muddy water for 2 weeks in a warm place, observe and record the changes in properties, volume and weight before and after, what is happening?
- Research filtration systems using the internet and books, how do they differ? how are they similar?
- Research what needs to be filtered to make drinking water safe.

Useful Links:

- <https://www.youtube.com/watch?v=RqWV7ozfENQ> - Making a mini water filter
- <https://www.youtube.com/watch?v=oXYZAaMGsl> - Filtration demonstration Brian Cox / Royal Society
- <https://www.youtube.com/watch?v=tJlHsxvj5YI> - Sewage treatment Brian Cox / Royal Society
- <https://www.youtube.com/watch?v=UntEw3Bvjxw> - Solutions, solvents, solutes animation
- <https://www.youtube.com/watch?v=KMP9-49l1U4> - Water treatment animation

How do you think the different objects make the water clearer?
Can we use more than one object to clean the water?
Which substances dissolved in the water?
how can we get them back out?

