Shipwreck Separation

Your task is to design and perform an experiment to separate a mixture collected at a shipwreck site into the purest components possible.

"There was a terrible storm, and the oil tanker became lost in a fog and was forced up against the rocky reef. The iron hull grated against the rocks, broke apart and unfortunately oil leaked into the water.....your team, as experts in separation techniques, has the important responsibility of cleaning up this environmental disaster and isolating the 4 main components found at the site. You must end up with four pure samples in four separate beakers - one of water, sand, iron, and oil."

The sample contains water, sand, iron and oil.

Aim: To separate a mixture into four pure substances.
SC: I can describe how our method affected the success of the separation.

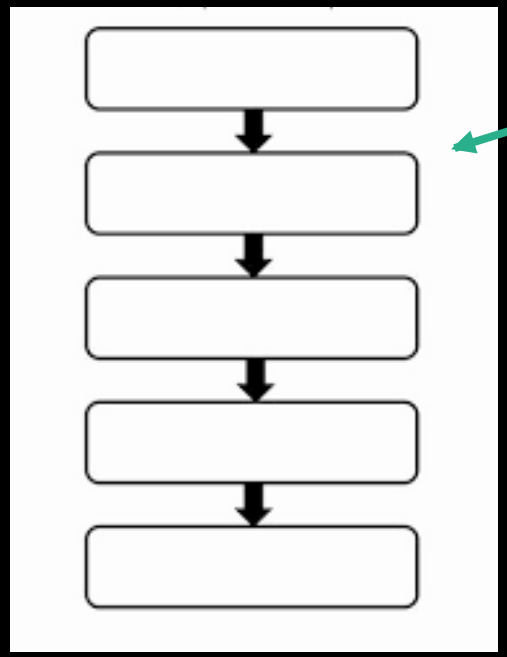
Work in groups of 3. Each group is given an A3 sheet of paper. Everyone in the group must add to the A3 sheet- scribe 1, scribe 2, scribe 3.
Here are the main steps of the task.

1. Design your method: decide on the separation techniques, the equipment you need and the order in which each substance will be separated 8min
2. Carry out your method to separate the four substances 15min
3. Clean up and present your samples for other groups to evaluate for purity
4. Evaluate the results of the other groups 10min
5. From your evidence, decide which group produced the purest substances.
6. Each student writes a conclusion to answer the SC 5min. The A3 sheet is submitted for the materials and methods for each group.

Experiment design: 8min

1. What separation techniques will you use? With your group brain storm the techniques and equipment you will need to separate out each substance. Scribe 1 makes a table like this to record the techniques.

Substance	technique	Equipment
Water		
Oil		
Sand		
Iron		



2. What order would work best?
Scribe 2 draws up a flow chart that steps out the order of the techniques you will use to separate each component.

3. Check that the equipment you need is available. If not discuss your equipment with a teacher.

4. Double check that your method plan will produce the purist substances!

5. Check with a teacher that it is ok for your group to begin the separation process.

Peer evaluation for purity of separated substances: 10min

Decide on criteria for assessing each substance. Examples from class

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Scribe 3 will record the assessment results.

In your group assess as many other groups as you can in the time based on the sampling criteria and group discussion.

Give each sample for each group a score from 1 -3 where 3 is most pure.

Group (names)	Water	oil	Sand	Iron	Total

Extension

In your conclusion also:

1. Discuss how you would separate salt if the water had been sea water.