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WATER

How Clean is Your Water

Introduction.

Nowadays in this country we take clean water, pumped directly into our homes, for granted, but it wasn't always the case and is still not so in many countries. This second water related issue focuses on children investigating dirty water, why we need it to be clean and how it can be cleaned; together with the issues of access to water.

Curriculum areas were mentioned in the previous issue, to these can be added:– Geography, knowledge of contrasting Less Economically Developed (LED) countries; Science, solubility and dissolving; D & T, designing systems to clean water; Maths, graph work; History, health issues from history, development of clean water; Citizenship, becoming informed citizens. The following ideas which could be used for a topic on investigating water are mainly based on science and geography, with close links to the current QCA schemes - Science Unit 7 and Geography Unit 11. We suggest ways of combining work to aid use of time, and development of cross curricular skills. Thus enhancing skills that are common to both subject areas, use of geographical observations to prompt scientific enquiry and demonstrating how scientific findings can be used in geography. A "flow" of lessons is suggested, which can be adapted to suit individual needs and/or topics; each of the lesson ideas will also stand alone within an existing scheme.

Background Information.

Even water that appears to be "clean" is not necessarily so and may contain harmful (or non harmful) components that cannot be seen. Thus even cleaning water so it looks usable will not result in drinkable water, although it may be useable in the context of flushing toilets. Some houses are now being built with dual systems where there is one source and tap for drinking water and another source and taps for other uses. Here rainwater is harvested and treated for use where a lower quality of water is acceptable. Investigating these systems can be used as an extension investigation to the main activities below, or included as Geography activity 5. In LED countries water may not be cleaned to the same extent as that in the UK, this has implications for health in those countries.

Using the Ideas.

The suggested activities are divided up into science and geography in the grids below and are followed by a flow chart indicating how they are linked and combined. The first two and the last are combined lessons. The activities do not have to be used in the specified order if an alternative suits your aims better. Investigations are aimed at Years 5 and 6, mostly working in small groups with minimal supervision, when used with years 3 and 4 more guidance and supervision will be needed. Use of some activities will depend on the ability and age of the children.

Science Activities

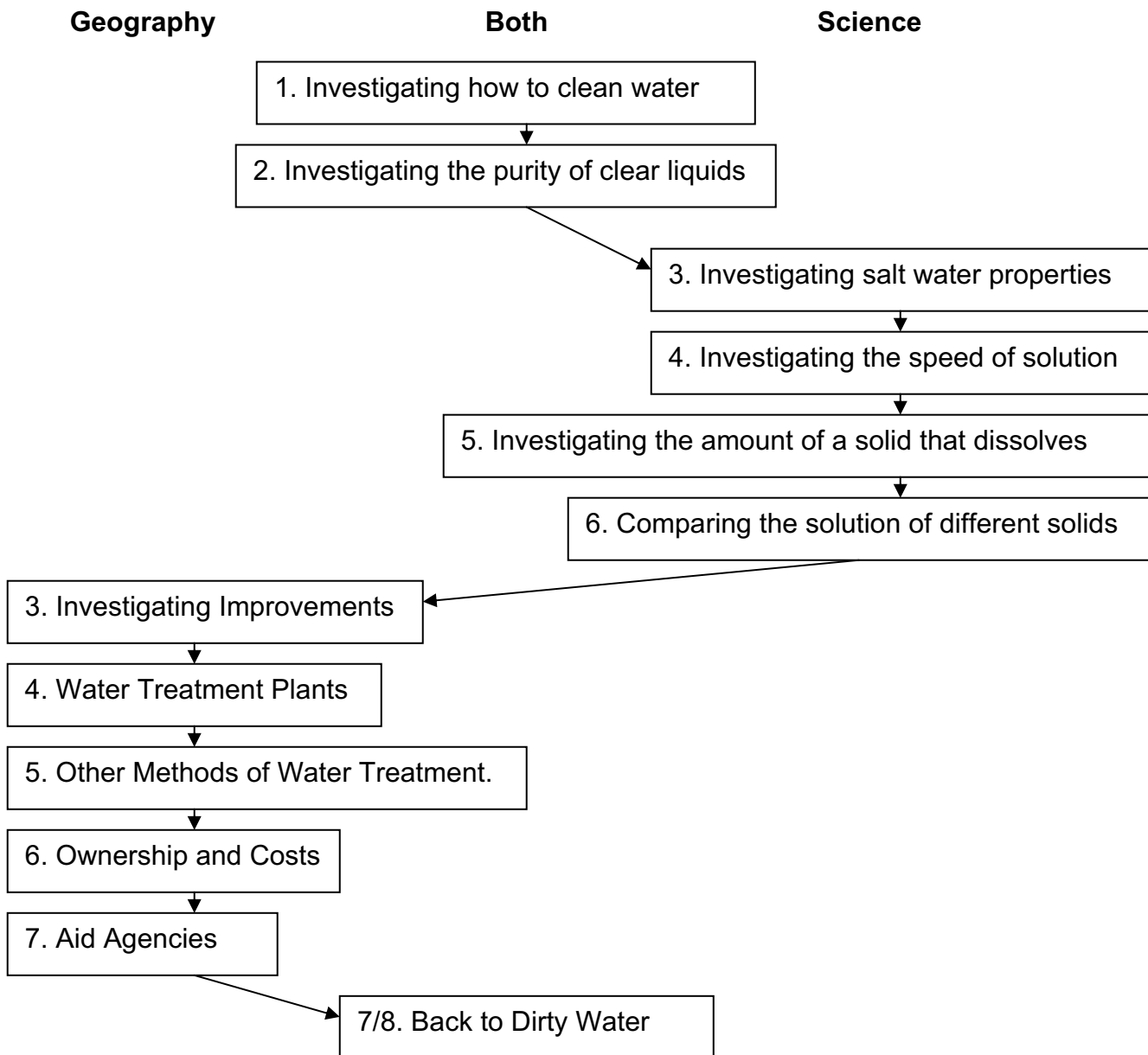
Act	Science. Unit 6C. More About Dissolving.
1	<p>Investigating how to clean water. Discuss what makes dirty water; investigate how they could clean water. Y5 /6 – In groups, challenge the children to develop an investigation and test their theory. Y3/4 – As a class develop an investigation and then test their theory. Both – Challenge who can produce the cleanest water? Give each group a measured sample of dirty water (e.g. pond water); their task is to produce the cleanest water whilst retaining the largest amount of water. Provide a variety of resources to make filters with (e.g. fine mesh net, sieves, paper towels, jey cloths, coffee filters, etc).</p>
2	<p>Investigating the purity of clear liquids. Discuss what is “useable” water. Investigate if there is anything in water that you cannot see. Ask children to predict which of a number of liquids are pure or whether there is any material dissolved in it. Children devise methods to test predictions and carry these out. Evaluate their predictions and why they were correct or incorrect. Sample liquids could include: - sea water, sweet water, tap water, distilled water, blue coloured water.</p>
3	<p>Investigating salt water properties. Discuss what happens when salt water boils evaporates and condenses. Will the condensation be salty or not? Predict, test and discuss results. Repeat for blue coloured water. Discuss results and reasons.</p>
4	<p>Investigating the speed of solution. Ask children for everyday examples of when we dissolve solids in water. Ask them to suggest ways to help them dissolve quicker. As a group devise an investigation to find out if the speed of dissolving can be changed/enhanced. Is this the same for different solids? Under guidance the children predict, plan, carry out, record and report back their findings. Produce a graph of their results.</p>
5	<p>Investigating the amount of a solid that dissolves. Present the children with a soluble solid. Ask them to devise an investigation to find out whether there is a limit to how much will dissolve in a given amount of water. Guide children with investigation. Discuss results. Working in groups the children can repeat using different amounts of water (e.g. 50cm³, 100cm³, 150cm³, etc). Record on graphs and look for a pattern. Some suggested solids: - bicarbonate of soda; salt; sugar.</p>
6	<p>Comparing the solution of different solids. Present the children with a range of solids. Ask them to repeat activity 5 in order to investigate whether different solids dissolve equally in water. Different groups could have different solids and prepare a graph to present to the rest of the class, with individual patterns then noted and compared.</p>
7	<p>Back to dirty water. Using information gathered during the whole topic devise a different way of cleaning water. This could be done using an earthenware flower pot, lined with a filter paper, then layers of one third each of charcoal, washed sand and gravel; a sieve or net can be held above these to collect large debris. This uses components that are used in water treatment plants.</p>

Geography Activities.

Act	Geography. Unit 11. Water.
1	<p>Investigating how to clean water. Discuss what makes dirty water. Investigate how they could clean water. Y5/6 – In groups, challenge the children to develop an investigation and test their theory. Y3/4 – as a class develop an investigation and then test their theory. Both – Challenge “Who can produce the cleanest water?” Give each group a measured sample of dirty water (e.g. pond water); their task is to produce the cleanest water whilst retaining the largest amount of water. Provide a variety of resources to make filters with (e.g. fine mesh net, paper towels, jey cloths, coffee filters, etc).</p>
2	<p>Investigating the purity of clear liquids. Discuss what is “useable” water. Investigate if there is anything in water that you cannot see. Ask children to predict which of a number of liquids are pure or whether there is any material dissolved in it. Children devise methods to test predictions and carry these out. Evaluate their predictions and why they were correct or incorrect. Sample liquids could include: - sea water, sweet water, tap water, distilled water, blue coloured water.</p>
3	<p>Investigating Improvements. Children use books and the internet to investigate how people in the UK haven’t always had access to clean water and the problems associated with this, linked to health. Research improvements and methods related to cleaning water, including filtering systems and the use of light waves.</p>
4	<p>Water Treatment Plants. Arrange a visit to a water treatment plant. Follow up with a discussion relating to how cleaning water is linked to our knowledge of soluble substances. Discuss the importance of a plentiful supply of clean water.</p>
5	<p>Other Methods of Water Treatment. Children investigate other methods of water treatment. This can focus on the use of small reed beds, filter beds and UV light, and systems used at environmental specialised sites such as The Centre for Alternative Technology or Hockerton Housing. www.hockertonhousingproject.org.uk and www.cat.org.uk</p>
6	<p>Ownership and Costs. Children discuss who owns water and rain, and relate this to water availability and provision. Investigation into the costs of water supply in the UK and in a LED country. What is included within these costs?</p>
7	<p>Aid Agencies. Children research the work of aid agencies in water provision in third world countries. This can be linked to a topic related to a less economically developed country. Links can also be made to citizenship. Discussion relating to why water needs to be clean and problems that result if it is not.</p>
8	<p>Back to Dirty Water. Using information gathered during the whole topic devise a different way of cleaning water. This could be done using an earthenware flower pot lined with a filter paper, then layers of one third each of charcoal, washed sand and gravel; a sieve or net can be held above these to collect large debris. This uses components that are used in water treatment plants.</p>

Flow Chart for Activities.

Geography activities from issue 67 lead into those below.



Forthcoming Events. Full information is available from the respective web sites.

ESTA Primary Team Members will be providing practical workshops, resources and useful information at:-

Geographical Association Conference, Derby 9th – 10th April 2010. www.geography.org.uk

Rivers and Coasts in Action. Hands on workshop on rivers and coasts, their formation, erosion and evolution. Participants build their own rivers or coasts and watch them evolve through time. Ideas will be provided to help transfer this to individual classroom situations, using unusual everyday items and how to acquire and adapt resources.

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