

# National 5 Chemistry: Assignment

## Resource pack: Hydrogels

Learners will investigate a topical issue in chemistry, using knowledge and skills drawn from National 5 **Atomic structure and bonding related to properties of materials**, **Everyday consumer products** and **Properties of plastics**. This should take the form of a report.

The pack provides background information on:

1. Hydrogels - the basics. Use the websites to find out about hydrogels.
2. Hydrogels used in Nappies.
3. Hydrogels used in soils.
4. Hydrogels used in medicine.

## Background Information

Hydrogels are presently used in many products available in High Street shops for medical, horticultural and cosmetic uses (search 'hydrogel' or 'aquagel' on the internet.)

Hydrogels are a group of polymeric materials where the major constituent is water. They can be made from variety of substances, as described in the Wikipedia extract (search 'hydrogels').

## 1. Getting Started

You can do some reading on hydrogels at any of the following websites:

Use these websites to help you understand the CHEMISTRY of hydrogels. You are going to have to describe the chemistry of hydrogels in your report.

There are some experiments described in these websites. You can choose to do them, and this would contribute to one of your sources. You would need to check we had the resources, and you would need to do these at lunch time or after school.

- ◆ <http://robertcampbelluas.edublogs.org/hydro-gels/>
- ◆ <http://www.yourformula.eu/internalposts/hydrogels-from-nappies-to-artificial-organs/>
- ◆ <http://www.gcsescience.com/o70.htm>
- ◆ <http://www.rsc.org/Education/Teachers/Resources/Inspirational/resources/4.4.2.pdf>
- ◆ Search 'weirdsciencekids<<http://weirdsciencekids.com/OilspillexperimentPolymer>.> OilspillexperimentPolymer" : hydrogel experiment for clearing up oil spills.
- ◆ Search – 'Weirdsciencekids and watergel' :absorbency of hydrogel.
- ◆ <http://www.bbc.co.uk/news/science-environment-18477088>
- ◆ Weirdsciencekids - website aimed at pupil level.
- ◆ RSC, New TalkChemistry and LearnChemistry

A few examples of possible investigations are given below. Choose ONLY ONE area. You must come up with your own aim.

Investigation	Research
Absorbency of hydrogels: in nappies (or hair gel).	Investigate the benefits of using hydrogel rather than traditional liners in nappies.  Nappies can be recycled. Research why this is important.  Research the properties of hydrogels in relation to their structure and bonding.
Uses of hydrogels in soils: for water retention, and other uses.	Can hydrogels be used to absorb nutrient-enriched water?
Uses of hydrogels in medicine: for water retention, and other uses.	Research the use of hydrogels in any medical area, eg contact lenses, burns dressings, wound closures.

## 2. Absorbency of hydrogels in Nappies

[http://www.nationalstemcentre.org.uk/dl/70c8829cc9f4c2c442249b89c3f1b82c7cc6807b/8567-catalyst\\_18\\_1\\_335.pdf](http://www.nationalstemcentre.org.uk/dl/70c8829cc9f4c2c442249b89c3f1b82c7cc6807b/8567-catalyst_18_1_335.pdf)

<http://www.nuffieldfoundation.org/practical-chemistry/experiments-hydrogels-hair-gel-and-disposable-nappies>

## 2. Hydrogels in Soils

<http://www.amnh.org/learn-teach/young-naturalist-awards/winning-essays2/2009-winning-essays/superabsorbant-hydrogels-a-study-of-the-most-effective-application-of-cross-linked-polyacrylamide-polymers>

<http://www.monitor.co.ug/Magazines/Farming/A-way-of-growing-trees-and-other-crops-on-dry-soils/-/689860/2015424/-/xmbslaz/-/index.html>

## 3. Hydrogels in Medicine

<http://www.sciencedaily.com/releases/2012/03/120305160650.htm>

<http://ispub.com/IJS/13/2/3839>

[http://www.nationalstemcentre.org.uk/dl/79273c46715208a5d186675d901bf5c8db9d085e/8567-catalyst\\_18\\_1\\_335.pdf](http://www.nationalstemcentre.org.uk/dl/79273c46715208a5d186675d901bf5c8db9d085e/8567-catalyst_18_1_335.pdf)

<http://www.stevespanglerscience.com/lab/experiments/helpful-hydrogels>

[http://www.burnaid.com/technical-docs/Burnaid-Technical-Condensed\\_v1.pdf](http://www.burnaid.com/technical-docs/Burnaid-Technical-Condensed_v1.pdf)