



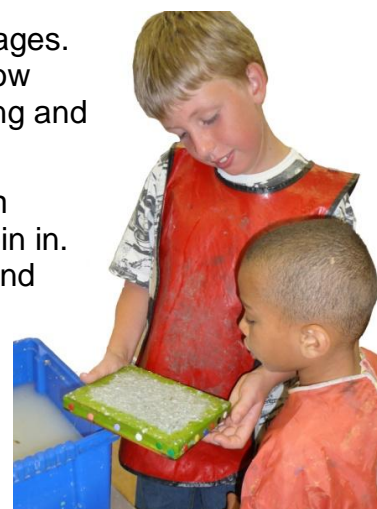
Making hand-made recycled paper Teachers' instructions

Introduction

Making recycled paper can be enjoyed by pupils and adults of all ages. It complements science work on the properties of materials and how they change, and geography / citizenship topics relating to recycling and environmental issues.

Papermaking is the perfect activity for an 'Environment Day', when pupils of different ages can work together and parents invited to join in. The finished hand-made paper makes beautiful greetings cards, and many schools plan their papermaking prior to celebrations such as Christmas or Mothers' Day.

To make recycled paper with a class of 30 pupils allow a full afternoon, plus about 30 minutes to make the pulp in advance and another 30 minutes to clear up after the children have finished.



This resource

These instructions are part of a package of materials supporting teachers to set up their own recycling 'factory' at school to make hand-made recycled paper with their pupils. Using this resource will give pupils a better understanding of the recycling process, an enthusiasm to recycle more and a beautiful end product to share with their families! The package includes:

- These instructions for teachers
- Two short (approx 3 min) videos: one shows making recycled paper on an industrial scale, and the other how to make hand-made recycled paper at home or school. These videos make clear the similarities between the two recycling processes and are suitable for KS1 and KS2 pupils. The videos can be viewed at zone.recycledevon.org/videos.
- Instructions for pupils, using pictures and simple text, describing the steps they should take to make paper when they visit their recycling 'factory.' Pupil instructions can be downloaded from zone.recycledevon.org/paper-making.

These instructions

These instructions include the following sections:

1. Making pulp
2. Setting up your papermaking 'factory'
3. Whole-class introduction
4. Whole-class plenary
5. Dismantling the papermaking 'factory'
6. Using your hand-made paper

1. Making pulp

The first step is to make your pulp – this process is shown in the video ‘Making hand-made recycled paper’ at zone.recycledevon.org/videos. Most teachers find it most time-efficient to prepare the pulp in advance. However it is highly recommended that you do a quick demonstration of the pulping process (step 4 below) as part of your whole-class introduction, to help pupils understand the circular nature of the recycling process.

You will need:

- paper from a recycling container. Starting with shredded paper is easiest, but any used paper will work. (Heavily inked newspaper will result in a greyish end product.)
- a bag made from an old muslin curtain (or similar fabric), about the size of a pillowcase *
- a hand blender
- water (warm, if possible)
- 3 plastic boxes / buckets

Instructions

1. Tear the paper into small pieces, unless you are using shredded paper.
2. Put the paper into a plastic container and fill it with warm water, ensuring the paper is fully covered. Leave it to soak overnight.
3. The next day, half fill another container with warm water, and add a handful of soaked paper.
4. Pulverize the paper to a pulp with the hand blender, using short pulses. Tap the blender firmly against the side of the tub after each pulse to remove any paper that has wrapped around the blades.
5. Add another handful of soaked paper, and repeat, checking regularly that the blades of the blender are free and not becoming clogged with paper.
6. Arrange the muslin bag over the third plastic container, and pour the newly made pulp into it. The water that drains through can be reused for pulping more paper.
7. Squeeze the bag firmly to remove as much water as possible.



Your pulp can be used straight away, refrigerated for a few days, or frozen.

2. Setting up your papermaking ‘factory’

Making recycled paper works best in a small group. These instructions assume a group of 6 pupils.

You will need:

- Paper pulp
- 12 papermaking frames: 6 mesh and 6 non-mesh*
- 6 plastic trays and 6 plastic boxes
- 1 muslin bag
- 6 newspapers
- 6 sponges
- J cloths, cut into quarters
- 1 permanent marker
- Optional extras e.g., glitter, petals

* Resource Futures sell frames and muslin bags. Contact education@resourcefutures.co.uk for details.



Instructions

It is easiest to set up your papermaking 'factory' before the pupils arrive – this should take about 15 minutes if you have all the equipment to hand.

1. Locate your 'factory' in an uncarpeted area if possible. In good weather outside is ideal. For 6 pupils a rectangular table approximately 1m x 1.5m works well.
2. Half fill each box with water (warm is nice) and place a tray and 2 papermaking frames (1 mesh, 1 non-mesh) next to each.
3. Soak the newspapers in the water, then fold each in half and put it on the adjacent plastic tray.
4. Add two large handfuls of pulp to each box.
5. Add any optional extras to make your paper prettier – you can experiment with glitter, flower petals, leaves or seeds. You may want to let pupils add these themselves before making their sheets of paper.
6. Using a permanent marker, label the J cloths with the children's names.
7. Follow the pupil instructions to make a few practice sheets of paper, to perfect your technique and to check the quantity of pulp in the water. It's normal for the first few sheets to be difficult to transfer to the cloths – this gets much easier as the pile of paper grows.

3. Whole-class introduction



Why recycle?

Show pupils the home and industrial papermaking videos at zone.recycledevon.org/videos and emphasise the link with your classroom recycling containers and the recycling you all do at home. Lead class discussion about why recycling paper is such a great thing to do, and how it helps the environment. You may want to cover the points below - a KS1 and KS2 focus is suggested for each:

a) Save resources

It takes 15 trees to make one tonne of paper, and an average family uses six trees' worth of paper a year. Recycling, and buying products made from recycled paper, means fewer trees need to be cut down.

- KS1: trees provide homes for birds and animals
- KS2: during photosynthesis, trees absorb carbon dioxide and generate the oxygen which we need to breathe. Forests are known as the 'lungs of the world'.
- Upper KS2: by absorbing carbon dioxide, a greenhouse gas, forests help to combat climate change

b) Reduce waste sent to landfill

If we put paper in a rubbish bin, it will probably end up in a landfill site, a large hole in the ground.

- KS1: if you keep putting something in a hole it will soon fill up – this is the problem we have with our landfill sites.
- KS2: paper sent to landfill will rot anaerobically (without oxygen) and generate methane, a powerful greenhouse gas.



c) Save energy

Paper recycling factories use less energy than those that make paper out of raw materials. Recycling paper saves up to 70% of the energy needed to manufacture it from new wood; recycling one tonne of paper saves enough energy to power a family home for nine months.

- KS1: recycling paper saves energy, just like switching off a light when you leave a room or turning off the television when you have finished watching it.
- KS2: most power stations that generate electricity also produce carbon dioxide which contributes to the greenhouse effect.



Introducing the papermaking activity

Having discussed why we recycle, show pupils a quick demonstration of the pulping process (see 1 above). Explain that you have set up a papermaking 'factory' in the school, in which each pupil will have the opportunity to transform the pulp into a beautiful piece of recycled paper. Because this paper is hand-made, each sheet will be unique.

Take groups of pupils into the 'factory' to make their own paper – you will need up to 15 minutes per group of 6 pupils, depending on their age and how many sheets of paper you allow them to make. Written pupil instructions are provided; however most children, especially KS1, will benefit from a demonstration of what to do from an adult or older pupil who is familiar with the process.

4. Whole-class plenary

A whole class plenary could include:

- What did pupils enjoy about visiting the papermaking 'factory'?
- What have they learnt about recycling?
- How will they share what they have learnt with their families?
- What would they like to use their hand-made paper for when it is dry?
- KS2: which products can we buy that are made from recycled paper?

5. Dismantling the papermaking 'factory'

At the end of the papermaking session, empty the boxes, using the muslin bag to sieve out any unused pulp (and avoid clogging the sink!) Older pupils will be able to help with this. The pulp can be frozen to use in the future, or composted (unless you have added extras that are not compostable, such as glitter.)

On each tray you will have a pile of damp cloths, each with a sheet of recycled paper stuck to it. While they are still damp, carefully peel each cloth off the pile, ensuring that the paper stays stuck to it. This is best done by an adult as the paper is still very delicate. Put the cloths on a flat surface (e.g., classroom tables or shelves) to dry, or peg them to a washing line.

6. Using your hand-made paper

Once the paper is dry, it can be peeled off the cloth carefully and used as desired. Mounted on a piece of coloured card it makes a beautiful greetings card – ask pupils to write 'hand made from recycled materials' on the back so the recipient is aware of its 'green' credentials!

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