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Dear Teachers,

Humans, if they are to grow and develop intellectually, need to be able to explore their environment, develop new ideas and take creative risks. Ideally this is achieved in a supportive environment in the home, school or club. Of course some prefer to work alone but working with others has enormous benefits. Sharing of time and ideas strengthens the relationships while working with other children allows for interaction with peers who have similar interests. Being allowed a choice between activities, or within activities, enables the individual to select what interests him or her and so personalises learning.

Thematic curriculum, which is often done well in primary schools but not in secondary schools, enables learning from different subject areas to be interrelated rather than treated as discreet packages of knowledge. Themes which result in the production of useful products and relate to the non-school community, extend this interdisciplinary relationship further and confer the idea that learning is not just confined to schoolwork but has relevance to the whole of life.

In the teaching of science my personal belief is that if students are to become really interested and enthusiastic about science then it is necessary for classrooms to respond to active minds and students to recognise science outside the traditional science classroom. The science must be 'real' and must relate to their life within the wider community. Above all, science must be fun.

This set of activities is intended for use in the upper primary, lower secondary classroom. I have tried to ensure that household materials and simple equipment are used, so that the activities are as cheap as possible to do. For each activity, one page contains instructions and questions for the student, while the other page is designed to help the teacher.

The theme of science and Christmas sparks a myriad of ideas and questions. How can you couple science with the religious/commercial aspects of Christmas? How can you work within this theme and still look at the interesting areas of science? What activities can be used to allow for exploration and creative risk taking? How do you balance the activities so that they provide the greatest appeal to all – male and female, young and old?

Making gifts can either involve science directly or use science and technology in the design or construction of the gift as well as encouraging students to complete the task, take care with its design and construction and to take pride in the finished product.

Many students enjoy the challenge of design, construction and problem solving. Making gifts allows for exploration within all of these areas; however, it presents the problem in such a familiar guise that even those students who are normally too timid to attempt these processes will try to make Mum or Dad a present.

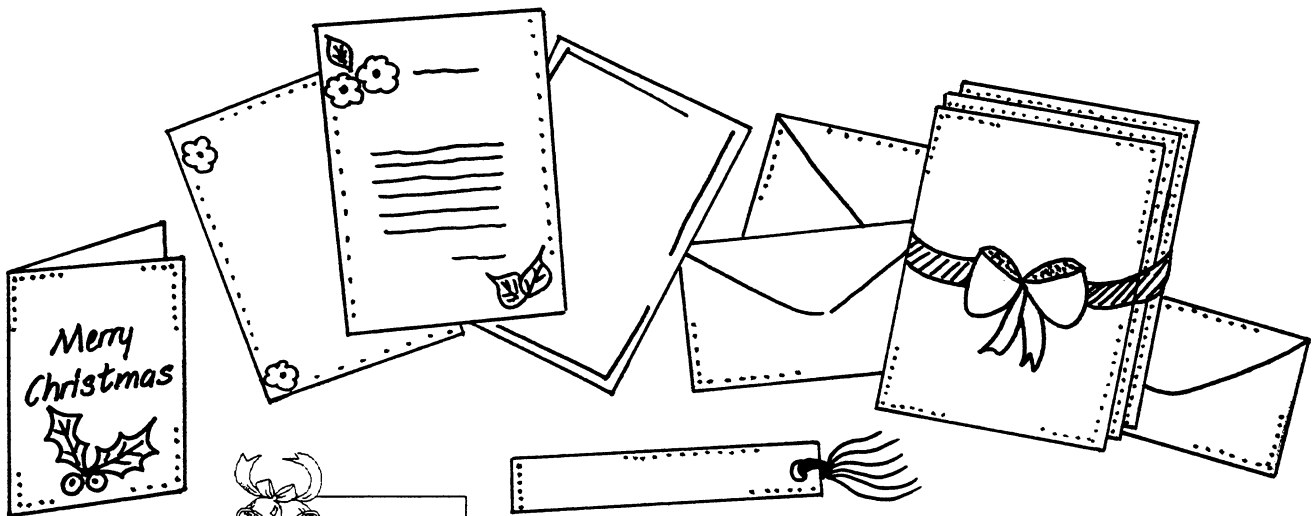
Some students have a keen fascination for science along with a desire for artistic and creative beauty. Gift making provides the ideal reason for combining these different skills which under normal conditions, within a secondary school, are seen as isolated disciplines.

Students interested in biology may be keen to make presents which represent this interest. For example:

- The growing of plants from seeds or cuttings and then transferring these plants to a terrarium.
- Making a flower press. This encourages students to look beyond their immediate interest to design and construct a press which can be given as a gift or be used to preserve botanical specimens or simply to press leaves and flowers. In this way their gift making can be used to express their personal identity.

Biology students often have a strong love of the environment, so I have tried to include activities which reflect this love and concern. Making paper is an ideal way of recycling the scrap paper generated within the house or photocopy room. This paper can then be given as a gift, dyed (using natural dyes) and used to make Christmas cards or decorations. To further this environmental concern when designing a science kit, a requirement is that the container be one which is usually thrown out and which could be collected and reused.

Students interested in chemistry may feel that chemistry couldn't be used in the theme of Christmas. However, enamelling, marbling, candle and chocolate making involve the applications of melting points, the use of dyes and pigments, solubility and the very sophisticated uses of catalysts. These activities allow students to



M A K I N G P A P E R

Recycling paper is fun...especially if you do it with friends. You can turn paper rubbish and plant material into new paper using a simple recycling technique. The type of paper you make will depend on what paper rubbish you recycle and how much plant material you put into it.

Material and Equipment

- Paper rubbish, plant material, bucket, water, blender, large container, mould and deckle, cloths (lots), breadboard

To Make Paper

- In the bucket: tear scrap paper into small pieces and soak in hot water until paper begins to look like porridge (and water has turned cold).
- Using the blender, mix a cup of the 'porridge' and two cups of water. Blend until smooth.
- Half fill a large container with water.
- Hold the mould, with the screen facing up, and place the deckle on top of it. Slide them both into the container.
- Put a scoop of pulp onto the screen and move the mould about gently (so that fibres interlace) until the pulp is 2-3 mm thick and evenly coats the screen.
- Remove the mould and deckle from the tray, then take off the deckle. Place a cloth on top of the mixture and turn the mould over. Lift the screen up leaving the wet pulp on the cloth. Cover this with another cloth until you have a small pile of papers. This stack is called a 'post'.
- Put a breadboard and a weight on top of your pile and leave it until the paper begins to dry. Lay out the post in separate sheets to dry.

Extensions

Now that you have the hang of it...what about:

- Dyeing your pulp using natural dyes. List the plants used and the colour they dyed your paper.
- How does the type of paper you start with alter the new paper you make? Which recycled paper is the strongest?
- How do flowers, petals, bark or leaves alter the appearance or strength of your paper?
- Can corn husks be used to make paper?
- Compare the appearance and strength of commercially recycled paper with that of new paper.
- Why would bleach be used in this process?
- Cotton is used in many 'paper' products. Can you find out where it is used and why? Try to get some cotton fibre to make paper.

Once Your Paper is Made You Can

- Remove rough edges and trim sheets to the same size. Decorate or tie with a piece of ribbon to make into a gift set of writing paper.
- Use your paper to make envelopes, cards or book marks.

