



Sun Changed Paper - Teacher's Notes

Sun Changed Paper

Science tries to explain the causes of change. It relies on a structured approach to observe the change (phenomenon) suggest a possible cause or causes for the change and then test each possible cause by itself. This will give us information that can be observed and measured by anybody. It does not rely on unsupported opinion that may vary from person to person.

Science activities in early and middle childhood can be structured using the first letters of the mnemonic **COWS MOO SOFTLY**

C Change one thing

M Measure one thing

S Everything else **S**tays the **S**ame



When we run experiments we always have an unchanged part so we can see and measure any changes. The part left unchanged is called the **CONTROL** and the part that has had one thing changed (in this case it has been exposed to sunlight) is called the **EXPERIMENT**. If we obey the rules above our experiment is a "**FAIR TEST**". This scientific method gives us the best chance to get good results (data).

HINTS

Select your papers with care. Expensive white paper has been bleached and coated with kaolin (china clay) to give it a whiter, smoother and more reflective surface. Light cannot easily penetrate through the coating. Recycled paper, paper used for newspaper and paper kitchen towels are less bleached and more porous allowing the energetic light rays to penetrate and cause change.

In Scotland and England until recently wet linen sheets and clothing were laid out on grass during sunny days to bleach whiter. Oxygen released from photosynthesis in the grass used energy from the sun to form ozone, an oxidizing agent or bleach. (Sometimes urine and lye were also added!)

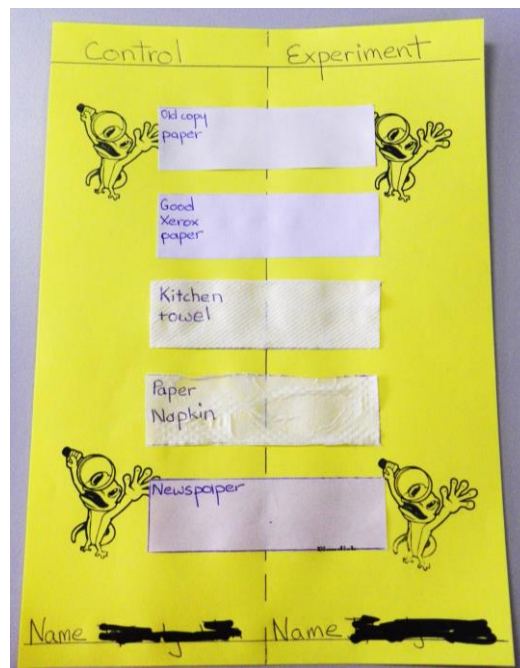




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Materials per student or group

- A sunny day
- Scissors
- Ruler
- Pen or pencil
- An A4 sheet of white or coloured paper
- 4 or 5 same sized strips of different white papers. I used, old cheap copy paper, good white copy paper, kitchen towel, a paper napkin and the unprinted strip from the edge of a newspaper.
- Glue



Method (See picture for more information)

1. Draw a dashed line that vertically halves the sheet of paper along its length. Students may carefully fold the paper in half and draw along the fold or use a ruler to find the width of the sheet of paper (21cm), half this and measure (10.5cm)





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2. Write "**CONTROL**" at the top on one side and on the other "**EXPERIMENT**".
3. At the bottom of each column write the names of the experimenter or experimenters.
4. Cut strips of each paper to the same size. I used strips 10cm x 3cm.
5. Label each strip.
6. Glue the strips across the vertical dividing line you have drawn.
7. Using the scissors cut the sheet into two halves along the dashed line.

You now have two halves of the experiment. The control strip will be left unchanged inside. The experimental strip will be placed outside in the sunshine and left for at least 2 hours. Anchor your strips with stones, books and rulers so that they do not blow away.

NOTE: The strips cannot be left on a sunny windowsill if the glass is tinted. Many classroom windows have tinted glass that reduces the energy of sunlight. These papers will be unaffected.

8. Bring the experimental paper back inside and lie it alongside the control. This will allow you to observe any changes.
9. Write any changes in the "Observation" table.

Observations

Type of white paper	Control colour (Before)	Experimental colour (After)
Old rough paper	Cream	Yellowish
Good quality paper	Bright white	White
Kitchen towel	Cream/white	Brownish
Paper napkin	White	Yellow
Newspaper	Grey	Brownish





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Discussion

What was the one thing we **CHANGED**?

Sunlight or no sunlight

What was the one thing we **MEASURED**?

Change of colour of the paper

Did everything else **Stay the Same**?

YES

Was this a fair test?

YES!



Would it have been easy to measure a change without the control sheet?

No. Some of the changes were very slight.

Why is it a good idea to hang out your clothes overnight if you live in the north of our state? This stops the Sun bleaching and rotting our clothes. If coloured materials are folded across the washing line a white line can be bleached into the material lying over the line and exposed to the most sunlight. Once bleached it cannot be changed unless dyed again.

Conclusion

What have we learned by this experiment? Sunlight can change the colour of some materials.

