

## Student Handout

In the following handout, students will be required to:

- Follow procedures for paper-making
- Make predictions
- Analyze their results

Provided in this document are sample answers (pages 2-3), a blank handout (pages 4-5) and procedures for making each type of recycled paper (pages 6-9). The blank handout should be made available to each group prior to the activity. Only the procedures for the types of recycled paper that will be made in class need to be printed. The first procedure, *Used Paper*, can be applied to different types of paper (for example, white paper or construction paper). Similarly, the second procedure, *Celery Paper*, can be applied to banana peels or whole mangoes instead of celery.



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## Recycled Paper - Handout Answers

Date: \_\_\_\_\_

Names:

\_\_\_\_\_  
\_\_\_\_\_

**The next two pages provide sample answers for the student handout.**

What type of paper will you make?

**Celery paper**

**Hypothesis:** How would you make your selected paper? Write down what you think would be some of the key steps of the process.

**Cut celery into pieces. Soften the pieces by boiling them. Squash them to turn them into pulp. Spread the pulp into a thin, flat layer. Let it dry.**

**Procedure:** While making the paper, record your observations for every key step of the process. For example, is there a change in colour or texture of the material?

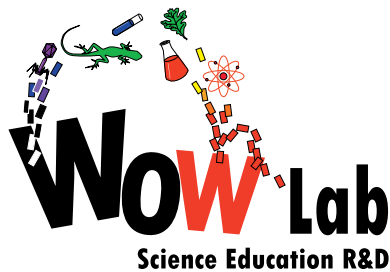
**Cut celery into small pieces.**

**Add water and bleach, and boil for a few hours. The celery pieces have softened after boiling, but still appear to be solid. The fibres can be seen in the mixture.**

**Blend the mixture to turn it into a pulp. The pulp is still the same green colour as the celery. Its consistency is similar to that of liquidy oatmeal.**

**Sieve the pulp and place it in the foil pan. The consistency of the pulp is now similar to that of lumpy apple-sauce. Add water and stir.**

**Spread the pulp over the screen then remove the screen from the pan. The pulp is spread in a thin green layer. Remove the extra water and let the paper dry for 24 hours. The paper is brittle and rough. The fibres are easily visible.**



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## Recycled Paper - Handout Answers

### Results

1. Reread your hypothesis. What are some similarities and differences between your hypothesis and the actual procedure you followed?

**Some differences are that bleach and water had to be added to the celery and the mixture has to be blended in order to turn it into a pulp. The mixture had to be sieved and extra water had to be removed.**

**Some similarities are that small pieces of celery are needed and these pieces need to be softened by boiling them. The mixture has to be in a thin, flat layer in order to be dried.**

2. Compare your recycled paper to the starting material you used to make the paper. What are some similarities and differences?

**The colour of the celery paper is similar to the colour of the original celery. It is, however, slightly darker and more brown in colour. Before it was processed, the celery was thick and had a smooth surface. The celery paper is thin, brittle, and has a rough surface. The celery fibres are easier to see in the paper than in the original vegetable since they are scattered.**

3. Compare the type of recycled paper made by your group with a different type of recycled paper made by another group. How are they similar? How are they different?

Make sure to note the two types of paper that are being compared: celery paper and newspaper paper.

**The celery paper is green in colour, whereas the recycled paper made of newspaper is grey. The newspaper paper is flatter than the celery paper which curved to form little bumps. The imprint of the screen can be seen in the recycled paper made of newspaper, but not in the celery paper. Both types of paper are rough to the touch, although the celery paper is rougher. The celery paper is thinner and more brittle than the paper made of newspaper.**



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## Recycled Paper - Student Handout

Date: \_\_\_\_\_

Names:

\_\_\_\_\_  
\_\_\_\_\_

What type of paper will you make?

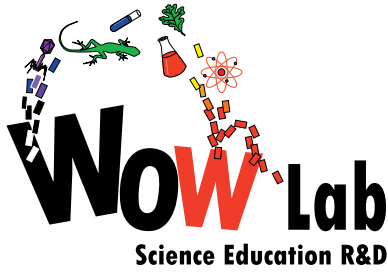
\_\_\_\_\_

**Hypothesis:** How would you make your paper? Write down what you think would be some of the key steps of the process.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Procedure:** While making the paper, record your observations for every key step of the process. For example, is there a change in colour or texture of the material?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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## Recycled Paper - Student Handout

### Results

1. Reread your hypothesis. What are some similarities and differences between your hypothesis and the actual procedure you followed?

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2. Compare your recycled paper to the starting material you used to make the paper. What are some similarities and differences?

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3. Compare the type of recycled paper made by your group with a different type of recycled paper made by another group. How are they similar? How are they different?

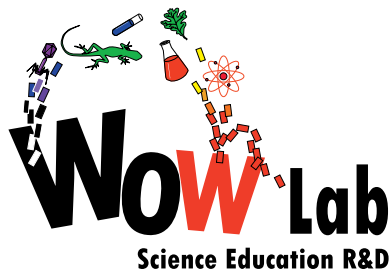
Make sure to note the two types of paper that are being compared: \_\_\_\_\_ paper and \_\_\_\_\_ paper.

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Recycled Paper - Handout Procedures

## Recycled Newspaper

### Part I

**Materials:** Bucket, jug of water, two sheets of newspaper

Step 1: Rip the newspaper into pieces about the size of postage stamps and put the pieces of paper into the bucket.

Step 2: Pour the jug of water over the newspaper pieces in the bucket and let it soak for at least 24 hours.

### Part II

**Materials:** Jug of water, pair of gloves, sieve, aluminum foil pan, stir stick, small bucket (or sand pail), decorations such as glitter, coloured tissue paper, dried flowers and food colouring (optional)

Step 1: Add a little bit more water to the bucket. Using the gloves, mush the paper with your hands until it looks like oatmeal.

Step 2: Allow the teacher to blend the pulp with a blender so that it is no longer clumpy.

Step 3: Sieve the pulp by pouring the pulpy water through a sieve into a bucket or a sand pail. Place the sieved pulp into the aluminum foil pan.

Step 4: Slowly add clean water to the pulp while stirring using the stir stick. If you want thick paper, add water until the liquid is like heavy cream. If you want thin paper, add water until the liquid is like milk.

Step 5: If desired, add decorations to the pulp and stir.

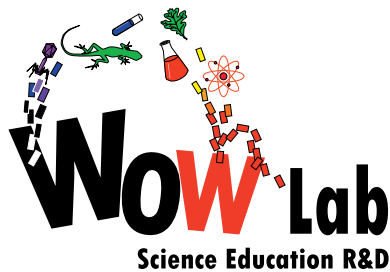
### Part II

**Materials:** Large plate, damp kitchen cloth, several newspapers, screen, aluminum foil pan with pulp, aluminum screening, paper towels, stir stick

Step 1: Prepare a couching bed for the paper by placing a newspaper on top of the large plate that will be used to collect the extra water.

Step 2: With the indented side facing up, slide the screen at an angle into the pulp and place it parallel to the bottom of the aluminum foil pan. Use your fingers to spread the pulp so that it covers the screen. Lift the screen straight up to remove it.

Step 3: Allow water to drain off the screen while holding it horizontally.



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## Recycled Paper - Handout Procedures

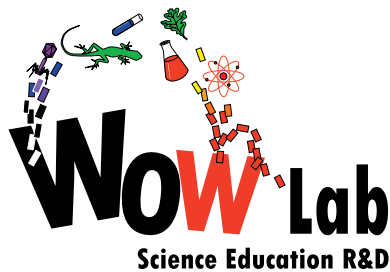
Step 4: Place the damp kitchen cloth flat on top of the pulp on the screen and gently press it down to sieve some of the water out of the pulp.

Step 5: Leave the kitchen cloth on top of the pulp and flip the screen so the paper lands on the couching bed. The kitchen cloth should be underneath the layer of pulp.

Step 6: Take the screen off of the pulp. Place a piece of aluminum screening on top of the newly formed sheet of paper. Blot out extra water using paper towels and newspapers through the aluminum screening.

Step 7: Remove the paper towels, newspaper and screening. Let the paper air dry or ask your teacher to iron it dry. The paper can be left on the couching bed or the kitchen cloth with the paper on it can be hung up using strong clips.

Step 8: Wait overnight for the paper to dry, then gently peel it off the cloth to see the final product.



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## Recycled Paper - Handout Procedures

## Celery Paper

### Part I

**Materials:** Large beaker or pot, bunch of celery, four plastic knives

Step 1: Break or cut the stalks of celery into bite size pieces and place the pieces of celery into a large beaker or pot. The teacher will add water and bleach to the celery. Boil the mixture for a few hours.

Step 2: Ask the teacher to blend the mixture.

### Part II

**Materials:** Jug of water, pair of gloves, sieve, aluminum foil pan, stir stick, small bucket (or sand pail), decorations such as glitter, coloured tissue paper, dried flowers and food colouring (optional)

Step 1: Sieve the pulp by pouring the pulpy water through a sieve into a bucket or a sand pail. Place the pulp into the aluminum foil pan.

Step 2: Slowly add clean water to the pulp while stirring using the stir stick. If you want thick paper, add water until the liquid is like heavy cream. If you want thin paper, add water until the liquid is like milk.

Step 3: If desired, add decorations to the pulp and stir.

### Part III

**Materials:** Large plate, damp kitchen cloth, several newspapers, screen, aluminum foil pan with the pulp, aluminum screening, paper towels, stir stick

Step 1: Prepare a couching bed for the paper by placing a newspaper on top of the large plate that will be used to collect the extra water from the paper.

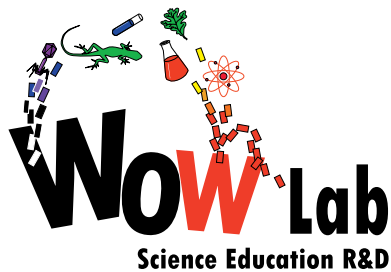
Step 2: With the indented side facing up, slide the screen at an angle into the pulp and place it parallel to the bottom of the aluminum foil pan. Use your fingers to spread the pulp so that it covers the screen. Lift the screen straight up to remove it.

Step 3: Allow water to drain off the screen while holding it horizontally.

Step 4: Place the damp kitchen cloth flat on top of the pulp on the screen and gently press it down to sieve some of the water out of the pulp.

Step 5: Leave the kitchen cloth on top of the pulp and flip the screen so the paper lands on the couching bed. The kitchen cloth should be underneath the layer of pulp.





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## Recycled Paper - Handout Procedures

Step 6: Take the screen off of the pulp and place a piece of aluminum screening on top of the newly formed sheet of paper. Blot out extra water using paper towels and newspapers through the aluminum screening.

Step 7: Remove the paper towels, newspaper and screening and let the paper air dry or ask your teacher to iron it dry. The paper can be left on the couching bed or the kitchen cloth with the paper on it can be hung up using strong clips.

Step 8: Wait overnight for the paper to dry, then gently peel it off the cloth to see the final product.