

Activity 51: Make Your Own Paper

Overview

Paper is one of many products that is manufactured from forest resources. In this activity, students investigate the papermaking process by trying it themselves. While papermaking can be rather messy, it is well worth the effort. Students are usually thrilled to find that they can make paper and that their product is practical as well as beautiful.

How to Use This Information

This supplement enhances the information provided in the Background section of this activity. Use this material in addition to the information contained on page 224 of PLT's Pre K-8 Activity Guide.

Resources

An Educator's Guide to NH Forests. Concord, NH: New Hampshire Project Learning Tree, 1998. www.nhplt.org/EducatorsGuide.htm

New Hampshire Timberland Owners Association www.nhtoa.org

UNH Cooperative Extension
<http://extension.unh.edu/Forestry/Forestry.htm>

Correlations to NH Frameworks

Literacy:

Written and Oral Communication:

Oral Communications: 1.1, 1.2

Science:

Life Science: LS5.1

Physical Science: PS4.1, PS4.2, PS 4.3

Science Process Skills: SPS1.3,

Correlations found at
www.nhplt.org/Correlations.htm

Early Paper Making in New Hampshire

Paper making has been a part of New Hampshire's industrial history and economy since the mid 1800s. The state's combination of abundant forests and free-flowing rivers fostered the growth of this industry, which began when wood pulp was introduced to the paper making process in 1867. Prior to this, cloth rags or some other kind of material provided the raw components for paper. Though New Hampshire's forests were plentiful with many species of trees—softwoods in the north and hardwoods in the mid to southern areas of the state—only poplar was initially combined with rags to make paper.

In 1886, paper companies added spruce to the mix of poplar and rags for paper making. These trees required seasoning for two to three years before processing, otherwise the high content of resin (pitch) in the spruce would "gum up" the machinery. The resin also weakened the paper, causing it to tear easily. Eventually hardwoods replaced rags in making paper so that today almost all species are used to make different kinds of paper.

Early paper mills were located next to rivers, which made use of this natural source of power. At first, the river water mechanically drove the equipment. Later, the water was harnessed to generate the electricity that operated the mill machinery. The Androscoggin, the Connecticut, and Merrimack Rivers all supported early sawmills and paper mills.

The rivers were also important for transporting logs to the mills. Moving felled timber from remote forests was a huge task and required the work of many men and teams of horses and oxen. Spring river drives were a common sight, as the fast-flowing rivers carried logs to the distant mills. Once at the mill, logs were cooked into a soupy pulp that was then filtered and cooked to make paper.

Paper Making Today

Paper mills were once an important part of New Hampshire's culture and economy. At one time there were ten paper mills and three paperboard mills in operation across the state. Pulpwood from New Hampshire still plays an important economic role as it is shipped to other states in the northeast and Canada for processing into paper.

Rivers are no longer used to transport the logs. Instead, today's industry is dependant on trucks and other machinery. Trees destined for paper making are cut into pulpwood size logs or chipped in the woods, and transported by tractor-trailer truck to a chipping facility or directly to the pulp mill.

Each mill uses a different mix of wood for their pulp. Both hardwoods and softwoods are processed into wood pulp.

Unlike other parts of the country, New Hampshire's temperate forests regenerate relatively quickly. The combination of significant rainfall and a moderate climate supports active tree growth. As a result, paper

The species used to produce pulpwood in New Hampshire include:

Hardwoods

sugar maple

red maple

yellow birch

paper birch

white ash

brown ash

American beech

quaking aspen

basswood

black cherry

hornbeam

red oak

white oak

Softwoods

red spruce

white spruce

black spruce

balsam fir

white pine

red pine

eastern hemlock

tamarack

companies and other land owners in New Hampshire do not actively plant and cultivate plantations of trees to support the demand for pulp.

Two commercial paper mills operate in the state, producing various types and grades of paper depending on the process and mix of wood pulps used. Non-integrated paper mills are mills that buy already produced pulp to make paper because they do not have the ability on site to make the pulp from wood fiber. Integrated mills have both pulp making and paper making abilities on site.

The Fraser Cascade Mill in Gorham is a non-integrated mill that produces several kinds of specialty papers. Sample products are DUMDUM® lollipop sticks, cotton swabs, and the paper for books by Steven King and John Grisham.

Monadnock Paper Company in Bennington is also a non-integrated mill. It uses 18 to 25 different types of wood pulp to produce 250 different grades of technical and spe-

cialty papers. Examples are paper for vacuum cleaner bags, wall coverings, sterile medical packaging, base for masking tape, circular chart paper, and artist grade paper for drawing or painting. A small percent of their paper products is made from 100% post consumer paper. This paper is used for text covers and annual reports.

NH Paper Making Firsts

Brown Company Mill, Berlin

The Brown Company of Berlin was among the state's first and longest-lived paper mills. It was also the world's largest paper mill at one time. As a result of its size, it was the first company able to support its own research and development work, earning it a place as a worldwide pioneer in papermaking. This distinction earned the company many "firsts" in paper making. This mill is no longer in operation.

Resources

For more information about the pulp and paper industry in New Hampshire, check this list of resources.

Paper and /or Pulpwood Companies

**Fraser Papers
(Fraser Cascade Mill)**
650 Main Street
Berlin, NH 03570
www.fraserpapers.com

Summer mill tours given through the Northern Forest Heritage Park.

Monadnock Paper Company

117 Antrim Road
Bennington, NH 03442
Telephone: 603-588-3311
www.mppm.com

Mill tours given on a limited basis.

Industry Trade Associations

American Forest and Paper Association
1111 19th Street NW, Suite 800
Washington, DC 20036
Telephone: 800-878-8878
202-463-2700
www.afadnpa.org

National trade association for the forest, paper and wood products industry.

American Pulpwood Association

Northeastern Technical Division
133 State St., Augusta, Maine 04330
www.apulpa.org

National trade association for the pulp and paper companies, primarily dealing with logging issues.

Technical Association for the Pulp and Paper Industry (TAPPI)

15 Technological Parkway South
Norcross, GA 30092
Telephone: 770-446-1400
www.TAPPI.org

National trade association for the pulp and paper industry, primarily dealing with technical issues in the manufacturing of pulp and paper.

Recycled Paper & Paper Making

The School Recycling Club
Supported by the Northeast Resource Recovery Association
2101 Dover Rd
Epsom, NH 03234
Telephone: 603-736-4401
theclub@nrna.net
www.schoolrecycling.net

Paper Industry History

Northern Forest Heritage Park
961 Main Street
Berlin, NH 03570
Telephone: 603-752-7202
www.northernforestheritage.org