Graphic Design and Production
PAPER PROPERTIES

Name: _____ Date: _____

OBJECTIVE:
Given this worksheet and paper samples, students will experiment with the characteristics of paper and determine particular properties of the sample sheets.

1. GRAIN DIRECTION:
Grain direction is determined by the way the sheet was formed on the papermaking machine. The fibers aligned long ways with the Fourdrinier as they flowed onto the machine. Paper is cut and packaged "grain long," which means that the grain runs vertically on the sheet—in alignment with the longer direction, or, "grain short," which means that the grain runs horizontally across the sheet, in alignment with the short dimension. Reasons that the designer and the press operator should understand grain are:

a. paper feeds and runs more smoothly on the press if it is grain long
b. paper folds best with the grain

ACTIVITY:
Use four sheets of the SAME type and size of paper to do the following three grain direction tests. Put them into your notebook labeled according to the method, and with the grain direction indicated.

a. Moisten a sheet of paper and note the direction of the curl. The paper will curl in the direction of the grain.
b. Tear a sheet of paper long ways, and a second sheet across. The straighter tear is with the grain.
c. Fold a piece of paper long ways, and also across. Feel the folds. The smoother fold is with the grain.

2. BRIGHTNESS:
Brightness is a measure of the paper's ability to reflect light. All white papers are neither the same shade nor the same brightness. Some whites are considered "warm whites" and print reds and yellows best. Others are "cool whites" for printing blues and greens. A "balanced white" is best for skin tones.

ACTIVITY:
Find coated sheet stock from four different magazines. Tear them out and put them side by side. Compare the shades. Are some warmer (yellowish), some cooler (bluish), etc. Label them as follows:

a. The name of the magazine.
b. Your evaluation of whiteness and brightness.

3. OPACITY:
Opacity is the property of paper which obstructs light and prevents print on one side from showing through on the other. It may just mean using thicker paper, but some very thin papers are manufactured to have high opacity.
Opacity guidelines:

a. Thick in more opaque than thin.
b. Rough is more opaque than smooth.
c. Coated is more opaque than uncoated.
d. Dark is more opaque than light.

ACTIVITY:
Collect three sheets of coated paper from magazines, using three different sources. Collect three sheets of uncoated paper, printed or plain. Label each sheet as to its kind of paper or the name of the magazine. Place each sheet over the opacity tester and compare opacities. Label each sheet as follows: “Image does not show through,” “Image barely shows through,” “Image shows through a great deal,” etc.

4. BASIS WEIGHT
The basic size of a kind of paper is the size it is cut to at the mill. This may be a variety of sizes, and different kinds of paper have standard basic sizes. Five hundred sheets of the basic size gives you the basis weight. Therefore, if a paper is 20 lb. paper, 500 sheets in a ream will not weigh 20 pounds, but 500 sheets before trimming to ream size did weigh 20 pounds.

ACTIVITY:
Locate three sheets of paper that are three different weights. The weight can be found on the package. Write on each the kind of paper, the manufacturer, and the weight.

PAPER CATEGORIES

OBJECTIVE: Given this worksheet and paper samples, students will identify paper by category.

A. COATED PAPER:
Coated paper has a gloss to it, made by a coating put on the sheet in the paper-making process. Why is paper coated?

- smoothness
- opacity
- improved color and brightness
- water resistance
- reflectance

Process color printing is done with transparent inks. Light passes through the layers of dots to the paper, then is reflected back through the ink from the paper. Higher reflectance means better looking color.

ACTIVITY:
Ask the instructor for coated samples and compare the different kinds of coated stock. Locate a variety of magazines and find some different kinds of coated stock. Locate and label what you determine to be an example of each of the following:

- Gloss coated: shiny surface, high degree of light reflectance
- Dull coated: little or no gloss; sheen rather than shine.
- Matte coated: glare free; the least shiny of the coatings
- Cast coated: highly polished, mirror like surface. This may be hard to find.

B. BOND:

Bond is what you might refer to as copy paper or typing paper. It is a fairly inexpensive paper.

ACTIVITY:
Locate sheets of white bond and colored bond. On each sheet, write the following information:

- paper category
- weight
- paper manufacturer
- name of the paper
- color

C. LASER:

Laser paper is formulated for laser printers, to give a top quality image which can be used for printing.

ACTIVITY:
Locate a sheet of laser paper. On each sheet, write the following information:

- paper category
- weight
- paper manufacturer
- name of the paper
- color
- comparison of the whiteness, opacity, and smoothness to bond

D. TEXT AND COVER:

Text and cover are high quality, fairly high-priced, uncoated papers. They come in a wide variety of finishes and colors. Usually one type of paper comes in both text and cover, with the text being the light weight, used for letterheads and pages, and the cover heavy weight, used for business cards, folders, covers, etc.

ACTIVITY:
Locate examples of text and cover. On each sheet, write the following information:

- paper category
- weight
- paper manufacturer
- name of the paper
- color

E. OFFSET

Offset paper is designed for offset presses. It has a resistance to moisture and a strong surface strength. It comes in weights slightly heavier than bond, and is more opaque than bond, making it more suitable to two-sided printing.

ACTIVITY:

Locate an example of offset paper and on it write the following information:

- paper category
- weight
- paper manufacturer
- name of the paper
- color

F. NEWSPRINT:

Newsprint is an inexpensive paper made from groundwood pulp and without a lot of additives.

ACTIVITY:

Locate a piece of newsprint and tape it to a sheet of notebook paper. Label it, and beside the sample describe these properties of the paper:

- whiteness
- smoothness
- strength

G. INDEX/VELLUM BRISTOL:

These are two relatively inexpensive types of card stock. Index paper is the paper used for index cards.

ACTIVITY:

Locate a sample of each and on each write the following information:

- paper category
- weight
- paper manufacturer
- name of the paper
- color
- description of the texture, and how you can tell one from the other

H. PRESSURE SENSITIVE:

This is what you would call a sticker. It is a paper with a self adhesive coating which is removed to reveal the sticky coating.

ACTIVITY:
Locate a piece of pressure sensitive paper and trim a section to about 4”x4”. Remove the backing and stick the sheet to a piece of notebook paper or bond paper. On the notebook paper, write the following information:

- paper category
- weight
- paper manufacturer
- name of the paper
- color

I. CARBONLESS:

Carbonless is chemically coated so that when you write or type on it, one or more duplicate copies can be produced at the same time. Carbonless can be bought in 2-part, 3-part, 6-part, etc. The original is always white, the second page is always yellow, the third pink, and then gold, green, and other colors are used for additional parts. The paper can be purchased in packs of white, yellow, pink, etc., or, can be purchased in sets of each color in a ream. If you buy by the set, the paper is already in order; if you buy by the color, you will have to collate, or sort, the colors. The paper might be coated on the back only, (the first sheet), coated on both sides (middle sheets), or coated on the front only (last sheet). Anytime you write or type on this paper if two coatings come together, you will get a copy. If only one coating comes in contact with an uncoated sheet, the carbon will not work.

ACTIVITY:
Locate a set of carbonless paper and write the following information on the white sheet:

- paper category
- paper manufacturer
- name of the paper

On all sheets, write the following:

- the number of coatings:
    - for paper with only a back coating, write “CB, Coated Back”
    - for paper with a front and back coating, write “CFB, Coated Front and Back”
    - for paper with a front coating only, write “CF, Coated Front”
- the weight (NOTE: The weights of the sheets in the set will differ because some are coated on two sides and some on one. You will see more than one weight listed on the package. The heavier weight is the 2-sided coated sheet.)

BUYING and PRICING PAPER

OBJECTIVE:
Given this worksheet and some paper pricing sheets, students will answer questions that demonstrate an understanding of reading a paper price sheet.

Paper is sold by the roll or in cut sheets, and bought according to what is required by individual presses.

TOMAHAWK TEXT PRICE SHEET:
Paper can be sold in large sheets, ready to be cut for the job. Tomahawk Text is an example of a paper sold in large sizes. This paper can be sold by the sheet or by the carton. On the price sheet, the underlined number in the paper size is the direction of the grain.

How many sheets are in a carton of 60 lb, cream white, 23x35?
_____

How many sheets are in a carton of 70 lb, peach, 25x38?
_____

How many colors does this paper come in?_____

What weights does it come in?_____

What sizes does it come in?_____

Just as one pays less per ounce when he buys the giant size of Tide, one pays less per sheet when he buys paper by the carton. In the case of this paper, one gets additional price breaks for buying more cartons—a break at 4 cartons and a break at 16 cartons.

PAPER IS ALWAYS PRICED BY THE THOUSAND SHEETS. If one has paper that is priced at $20/thousand, he can buy 500 sheets, but the price is still $20/thousand. He orders half a thousand and pays half of the $20/thousand price.

Use the price sheet for Tomahawk Text to solve the problems below:

<u>cool white, 60 lb, 25x38:</u>

Sheets per carton: _____
Price per carton for 1 carton _____ total for 3 cartons_____
Price per carton for 4 cartons _____ total for 6 cartons_____
Price per carton for 16 cartons _____ total for 18 cartons_____
Price for 5000 sheets_____ Price for 20,000 sheets _____

<u>cream white, 60 lb., 23x35</u>
Sheets per carton: _____

Be careful here—answers will be different from above because of the difference in the number of sheets per carton. Remember that pricing is not by the carton, but by the thousand sheets!

Price per carton for 1 carton _____ total for 3 cartons_____
Price per carton for 4 cartons _____ total for 6 cartons_____
Price per carton for 16 cartons _____ total for 18 cartons_____
Price for 5000 sheets_____ Price for 20,000 sheets _____

M**OHAWK VELL**UM **COPYTEXT PRICE SHEET:**

This is a paper that is sold in cut sizes. The sizes available are the most common cut sizes. If one needed another size for a job, he would have to figure out if he could pick one of these sizes and cut it or should he buy larger sheets and cut them. One would need to determine where he would get the least amount of waste and, therefore, the best price.

Use the price sheet for Mohawk Vellum Copytext to solve the problems below:

How many sheets are in a carton of 8 1/2x11 blue, 60 lb.? _____
How many sheets are in a carton of 11x17 blue, 70 lb.? _____

Because these numbers are always changing one needs this information to determine paper costs. The cartons are roughly the same size and the amount of sheets per size and weight is based on what fits in the box.

How many colors does this paper come in?_____
What weights does it come in?_____
What sizes does it come in?_____

This paper is sold by the ream and by the carton. If the company has to open a carton to give a customer one or more reams, the price goes up per sheet because they don't know when someone else will come along and order the rest of those reams from an opened carton. Some paper is not sold by the ream, only by the carton. There are 500 sheets in a ream, unless specified. Notice on the price sheet for Vellum Copytext that the paper underneath it—Mohawk Vellum Cover Copytext—is packaged 250 sheets per package, and the package is not called a ream. If one needed 6000 sheets of Vellum Copytext white, 60 lb, 8 1/2x11, he would order 1 carton and 2 reams.

<u>cream white, 60 lb, 8 1/2x11:</u>

Sheets per carton: _____

Remember that the price under the number of cartons is NOT the price for the carton, but the price per thousand sheets in that carton.

One needs 20,000 sheets. How many cartons? _____How many additional reams?_____
Price: _____ cartons @ _____/th = _____
_____reams @ _____/th = _____
TOTAL = _____