

Binding Media: Preparations and Comparisons

Materials:

Item	Amount per student	Amount for 24 students
Acrylic polymer binders	3 - 5 drops each	72 - 120 drops
Acacia powder	25 mL	600 mL
Egg yolks	1 - 2	24 - 48
Turpentine	8 mL	192 mL
Linseed oil	4 mL	96 mL
Sucrose (table sugar)	4 g	96 g
Glycerin	6 mL	144 mL
Alconox crystals	3 - 5 crystals	~0.25 g
Chrome Green (+ student prepared Prussian Blue, Indigo, Orange II)	< 0.1 g	2.4 g

Equipment:

Item	Amount per student	Amount for 24 students
Cheesecloth	40 cm x 20 cm square	2 yd.?
Small glass jars with lids	1	24
Egg separators (optional!)	1	4 - 6 ?
Disposable palette paper, 2x2" squares	20	480
Paintbrushes, assorted	1	24

Staff Notes: The gum arabic stock solution (made from the acacia powder by the students) needs to be refrigerated between its preparation and its use on binders. Because of the difficulties some people have with separating eggs, spare eggs for those who break theirs would be helpful.

Safety Issues:

- Chrome Green can be irritating to the skin.
- Review previous safety issues from the syntheses of each of these dyes used in this experiment with the binding media.
- Turpentine is irritating to your skin and respiratory systems, and is readily absorbed through them. Furthermore, it cannot be easily washed off with water. Avoid breathing these vapors, and if you get it on your skin, use alcohol to wash it off.

Procedures:

Gum Arabic Stock Solution

1. Mix 1 part acacia powder (~25 mL) with 2 parts (50 mL) boiling water (1:2 by volume!). Stir the chunky mixture to dissolve the gum. (It may foam....)

2. Allow it to cool to RT. Fold the cheesecloth so that it is four-ply and filter through it into a small glass jar with a lid. Refrigerate until needed for watercolor binder.

Egg Tempera Binder

1. Separate an egg yolk from the white. Then pass the intact yolk between the palms of your hands until it is rather dry.
2. Puncture the yolk sac and drain it into a 50 mL (or other small sized) beaker.
3. Measure the yolk volume in a graduated cylinder and dilute with an equal volume of distilled water. Stir well.
4. Note the color, texture and consistency of this binder.

Oil Paint Binder

1. Mix well: 8 mL of turpentine and 4 mL of linseed oil in a small beaker.
2. Note the color, texture and consistency of this binder.

Water Color Binder

1. Stir 4 g of sucrose with 4 mL of distilled water until it dissolves.
2. Add 6 mL of glycerin and 20 mL of the previously prepared gum arabic solution.
3. Add a few crystals of Alconox soap powder. Stir thoroughly to blend.
4. Note the color, texture and consistency of this binder.

Mixing Pigments With Binders

1. Collect squares of disposable palette paper for preparing the paint-binder mixtures, and other sheets of paper to paint them on. You may want to use plain copier paper, high quality stationery sheets or other materials. You must use at least two different paper surfaces!
2. Mix a small amount of each of four pigments (your own Prussian Blue, Orange II and Indigo and store-bought Chrome Green) with each of six binders (egg tempera, oil paint binder, watercolor binder, three different acrylic binders). Do not use all of any of the pigments! Note how well each pigment mixes with each binder, its color, consistency and texture after mixing. The acrylic binders are rather thick and will need to be diluted with water to make them into a paintable consistency. This step may be broken up however you like, but you probably don't want to mix all paints before using them....

3. Use each paint to paint on each of your chosen paper surfaces. Note how well it paints on the different paper surfaces, again including color, consistency and texture. Attach the painted swatches in your notebook near their descriptions.
4. Choose one pigment and play with the proportions of the various binders to this one pigment. What are the proportions that you like the best? How do you define the "best" combination here?

CLEAN UP: Save leftover pigments for future labs. The water-soluble materials can be flushed down the drain. Insoluble leftovers can be thrown away in the trash.

Reflections:

1. Be sure to answer the questions asked within each of the procedures above.
2. What adjustments would you make in your procedure to change or improve your finished product?