

LAKE PIGMENTS FROM COCHINEAL

NOTE: This protocol is quite forgiving. Your measurements do not need to be ultra-precise to produce a pigment, though variations in the quality of materials, amounts, temperature, technique, and time can produce differences in color from batch to batch.

RECIPE: STANDARD	
EQUIPMENT 1 hot plate 1 mortar and pestle 1 digital scale 1 large beaker (1 L) 1 small beaker (150 ml) 1 large jar (to catch the filtrate) 1 drawstring filter bag 1 pair of chopsticks 1 thermometer 1 potholder pH test strips 1 funnel 1 filter (or more, if necessary) 1 dull blade (palette knife) or stiff brush 1 oz plastic container with lid	MATERIALS 600 ml water (for potash (large beaker)) 100 ml water (for alum (small beaker)) 0.5 g cochineal 20 g alum (aluminum potassium sulfate) 8 g potash (potassium carbonate)

Procedure:

- Grind cochineal with a mortar and pestle.
- Enclose cochineal in filter bag large enough for material to move freely and water to penetrate it. Close the bag and tie tightly so no particles can escape through its opening.
- Put 600 ml water in 1 L beaker. Add 8 g potash and the cochineal bag to the water.
- Bring to a boil and extract dye at this temperature for 15–20 min.
- Meanwhile, in 150 ml beaker, dissolve 20 g alum in 100 ml water using heat. Set aside for later.
- After extraction of dye in the large beaker, remove dye solution from heat. Discard cochineal bag.
- *If necessary*: filter dye solution through filter paper to remove particles.
- Pour the alum solution into the dye solution slowly and incrementally, stirring constantly.
 - Check the pH as you add the alum solution.
 - Keep adding alum solution to dye until a pH of 6-7 is achieved, there is no further effervescence, and precipitation of the lake pigment appears to be complete.
- Allow the solution to settle for at least 15 min (ideally overnight).
- Pour solution through filter in a funnel. What remains in the filter is pigment. Discard filtrate.
- Wash pigment, pouring batches of clean water through pigment in the filter until filtrate runs clear, discarding filtrate.
- Allow the pigment to dry thoroughly on the filter (at least overnight, perhaps longer if thick).
- Using a dull blade or stiff brush, carefully remove pigment from filter. Collect pigment in small container and secure lid.

TIMING		
DAY 1	DAY 2	DAY 3
<ul style="list-style-type: none"> - Prepare work area, materials (~10 min) - Bring to boil and extract dye (~30 min) - Boil cochineal in potash solution (~20 min) - Add alum solution to precipitate (~10 min) - Leave to settle - Cleanup 	<ul style="list-style-type: none"> - Filter - Wash multiple times - Cleanup 	<ul style="list-style-type: none"> - Scrape dried pigment into container for later use - Cleanup
Schedule time: ~90 min	Schedule time: ~1 hour	Schedule time: ~20 min

NOTE: Activities do not need to take place on successive days.