# Kaolin Clay Products Teaching Materials

Dr. Audrey C. Rule

**Objective:** Students will be able to match cards that tell kaolin properties and uses with corresponding kaolin products to demonstrate their awareness of the uses of kaolin clays.

## Preparation of Materials

1. Print the accompanying pages on a printer (in color, if possible).
2. Cut out the card fronts and backs from the printed pages. Use a paper cutter if possible so that the edges are straight.
3. Cut 12 squares of mat board measuring 3 1/2 x 3 1/2 inches. Glue the card fronts that list kaolin properties to the fronts and the corresponding product pictures to the backs.
4. Obtain a plastic shoebox. Use wide clear package tape to affix the label “Uses of Clay Minerals: Kaolin Clays” to the outside of each end of the box.
5. Cut out the “Directions” card and glue to a mat board rectangle measuring about 4 1/2 by 6 inches.
6. Find an example of each of the products that will fit into the shoebox.

## Lesson Instructions

Pass around a hand specimen of kaolinite (a white clay). Ask students to brainstorm its properties (white, powdery, mixes with water, opaque, etc.) Then ask students to suggest any uses they can for this mineral (often students are aware that clays are used in ceramics.) Finally, allow students to work in small groups to match cards that list properties of kaolin clays with corresponding products. They will probably be surprised at the many uses of kaolin clays.

# Properties of Kaolinite

Sheet structure

Forms flat, platy hexagonal crystals

White color when pure

Naturally occurs as very fine particles

Water can be absorbed between particles

Water can hold particles together. Particles slide over each other

to form a plastic clay mass that can be molded and will retain shape when dry.

Platy particles suspended in a liquid will link together to coat and protect a surface when dry.

Can be compressed into tablets

Melts at a high temperature; thermal resistant

Electrical insulator

Found in large deposits in several places and therefore inexpensive

Usually forms from the weathering of feldspars in granitic rocks.

The kaolin clays include the minerals kaolinite, dickite, nacrite, and halloysite.

- Gives smoothness and gloss to the surface
- Fills in holes to reduce porosity and prevent “bleeding” of ink
- Adds opacity , brightness, and whiteness
- Reduces the cost
- Also used in printing ink to extend and increase smoothness

Cardboard Packaging


Kaolin is a filler and coating for cardboard products and inks.

- Bright white color
- Fine, smooth particles
- Easily extruded or pressed into cylinders

Chalk


Kaolin is a filler for blackboard chalk

- Improves durability
- Removes chemically active calcium hydroxide
- Reduces porosity
- Improves adhesion between cement and sand or gravel particles.

Concrete

Kaolin is an important ingredient in cement and concrete.

- Gives smoothness and gloss to the surface
- Fills in holes to reduce porosity and prevent “bleeding” of ink
- Adds opacity , brightness, and whiteness
- Reduces the cost
- Also used in printing ink to increase smoothness

Magazines

Kaolin coats most papers used today including magazine pages.

- Platy structure links the film together.
- Improves durability of surface.
- Thickens the liquid to reduce running
- Reduces the amount of pigment needed
- Less expensive than Titanium Dioxide

Latex Paint


Kaolin is a filler in latex wall paints.

- Excellent thermal resistance
- Superior electrical resistance
- Blends well with other clay minerals
- Pure, white

Electrical Insulator

Kaolin forms the body of electrical insulation ceramics.

- Absorbs moisture - keeps nose from shining
- Provides an opaque, white base for colors
- Adheres to skin
- Odorless
- Smooth texture

Face Powder


Kaolin is a base for make-up.

- Very pure, bacteria-free
- Chemically inert
- Can be compressed to form tablets
- Bright white color
- Odorless

Pharmaceutical Tablets

Kaolin is used in many pharmaceutical tablets as an inert filler or carrier for active ingredients.

- Blends well with oleoresins in plastics
- Increases electrical resistance
- Improves stiffness and hardness of plastic housing

Electric Wire Coating

Calcined clays improve the electrical properties of PVC and rubber-coated wires.

- Inexpensive filler
- Blends well with rubber
- Increases hardness and durability

Tire Inner Tube Rubber

Kaolin is a filler in rubber inner tubes and automobile tires.

- Blends well with rubber
- Inexpensive filler
- Gives gloss to surface
- Improves durability

Rubber Sink Mat

Kaolin is a filler in many rubber products.

- Can be easily molded to intricate forms
- Pure white color
- Accepts high gloss glaze
- Non-porous
- Resistant to high temperatures

Porcelain Dishes

Kaolin forms the body of fine china and porcelain.

**Uses of**

**Kaolin Clays**

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# Directions

- Lay out all of the kaolin products.
- Turn the cards over so that the statements on the colored mat board sides face up (photos on undersides).
- Read the purposes/ functions of using kaolin clays in each product.
- Match each set of statements with the correct product.
- Look on the back of the card to check your work.
- Did you know kaolin clays were so useful?

Uses of Clay Minerals

Kaolin Clays

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