

# K-12 IYS Activity



## Summary

Soils get their color from minerals and organic matter. In this activity students will make soil crayons to explore the various colors of soils.

## Learning Objective

To learn soils come in a variety of colors.

## Materials Needed

- Variety of collected colored soils or check with your local NRCS Office at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local/>
- Ziplock bags
- Baking sheet and aluminum foil or wax paper
- Hammer or mortar and pestle
- Sieves, window screens or panty hose
- Paraffin or Gulf Wax
- Can or glass jar
- Hot water in pan
- Cylindrical ice trays
- Plastic container for mixing
- Chopsticks

# Make and Share Soil Crayons

Soils come in many beautiful colors- just like a box of crayons! Use the following method to make crayons from soils. You can either make the soil crayons as a learning activity with a group, or make them yourself and share the resulting crayons with others. A short video demonstration is available here:

[http://youtu.be/mvebCxFxw?list=UUUm0\\_6Kd2ys5K6q4w4bhyKsw](http://youtu.be/mvebCxFxw?list=UUUm0_6Kd2ys5K6q4w4bhyKsw)

## Method

1. Find and collect a variety of colorful soils.
  - How can you do this? Always have sealable plastic bags with you. When traveling, watch for road cuts and whenever you see a colorful exposed profile, stop and collect a soil sample.
  - Whenever you or someone you know has to dig a hole, collect soil samples at different depths.
  - Ask friends, students, and neighbors to add to your collection by collecting soil samples when they go on trips or work in their yards.
2. Dry the soil samples.
  - Spread the soil on a baking sheet or tray covered with aluminum foil or wax paper to air dry.
  - Oven drying is not necessary.
  - How long will it take? That depends on how wet the soil was when collected and on the ambient conditions, such as temperature and humidity, when drying.
3. Crush or grind the soil samples.
  - Remove any rocks first.
  - Use a hammer to crush the soil aggregates.
  - Or you can use a mortar and pestle, if you have one dedicated for soils.
  - Or you may be able to use an old coffee grinder or blender.
4. Sieve the soils.
  - If you have standard screens available from a lab, sieve for particles finer than 0.5 mm. Coarser particles will not work as crayons.
  - If you don't have sieves, window screening can be used. Place a container under the screen. Pour the crushed or ground soil on the screen and shake the screen.
  - Panty hose can also be used. Place the soil in a cup. Stretch the panty hose over the top of the cup. Turn the cup upside down and shake over a container to catch the soil that passes through the panty hose.
5. Prepare the wax.
  - Place newspaper on the workspace to catch spilled soil or wax.
  - Use a paraffin for candle making such as Gulf Wax (available at stores like Walmart).
  - Shave or chop some paraffin into a can or glass jar.
  - Put water into a pot and heat to just below boiling.
  - Place the container of paraffin into the pot until it melts.

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*Celebrating the*



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## Make and Share Soil Crayons

6. Prepare the molds.
  - There are several things you can use as crayon molds:
    - o Hard plastic, pointed-end centrifuge tubes
    - o Ice trays that form cylinders (not cubes), lined with parchment paper or aluminum foil
    - o Shaped rubber or plastic molds (animal, cartoon characters, or other shapes)
  - In a small plastic container, you will mix about equal portions of sieved soil and melted paraffin.
    - o Small 45-ml (1.5 oz.) containers from Glad, Ziploc, or other brands work well.
    - o Use chopsticks, craft sticks, or a similar item to stir the mixture.
  - Pour about 15-ml (1 tablespoon) of melted paraffin into one container.
  - Pour an equal volume of soil into another container.
  - Slowly add the measured soil to the melted paraffin and stir. The mixture will thicken.
    - o There is a bit of know-how required for this step. Clay soils respond differently than sandy soils. Practice will provide the experience to know the best ratio for different types of soils. With too little soil, the soil will settle to the bottom. With too little paraffin, the crayons will not stick together.
  - Continue stirring the mixture while pouring it into the molds.
7. Cool the molds.
  - An ice bath can be used with hard-plastic containers.
  - Or you can place the molds in the freezer or refrigerator.
  - Molds can also be left on the counter or table overnight.
8. Remove and enjoy!

### Discussion Questions

1. How many colors of soil did we use today?
2. What might be some reasons for soil color variation?  
(*ans: minerals, organic content, soil type*)

Adapted from Dr. Dirt's Soil Crayons K-12 Teaching Resources page at

<http://doctordirt.org/soil-crayons>

### Additional Resources

[www.soils4teachers.org](http://www.soils4teachers.org)



Soil Science Society of America  
[www.soils.org](http://www.soils.org)