

**Materials needed:****Pre-chilled crocus "bulb"\*****Pebbles or potting soil****Small plastic cup or pot****Coffee filters****Black water-soluble marker****Paper straw, tape**

\*often called bulbs, the swollen base of a crocus plant is actually a *corm* because it has no layers inside

**VIDEO INSTRUCTIONS** at [SciWorkshop.org/KITS](https://SciWorkshop.org/KITS)

**Project 1:** See if you can trick crocus plants into blooming early, to bring color and cheer to the cold months of the year!



1. Chose to plant your crocus corm\* in soil OR in water with stones for support. **Which do you think will work better, and why?** They are both traditional methods for starting flower bulbs.

Fill a small cup most of the way with your planting medium of choice. For soil, use a container **with drainage holes**. Put a lid underneath to catch any extra water. For stones, use a container **without drainage holes**.

Set the crocus pointy (sprout) end up, and add soil or rocks to bury it halfway.

2. Water the right amount

Soil should be moist but not soggy. Don't let the soil dry out completely.

For stones: Add just enough water to *barely* touch the bottom of the corm. Go any higher and it is likely to rot. The roots can grow down into the water.



3. How does a dormant plant know that it is time to grow? The crocus have been kept in the cold and dark for 12 weeks. It uses temperature cues to know when to sprout!



For best results increase the temperature slowly, as would happen in nature. **After planting, keep your container in a cooler room (50-60 degrees F) with low light. In 2 weeks or so when the leaves are growing, move it to a warmer room with bright light.** Too hot and the blooms will fade quickly.

4. Tend to its water, temperature, and sun needs. **If your experiment is successful, your crocus will flower in 3-5 weeks!** It's ok to fail – it happens to scientists and gardeners all the time :) Either way, it's good to learn from your experience!



Flowers have interesting parts, and crocus are useful little plants. More info on last page

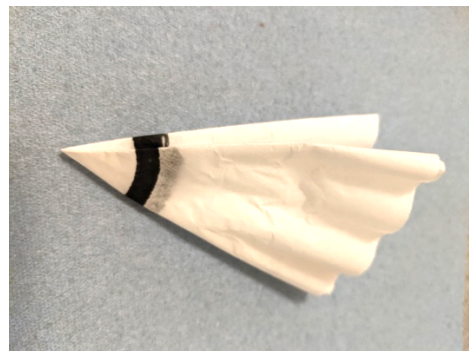
It's challenging to save bulbs to bloom again in future years. If you want to try, snip off the flowers when they start to fade. Fertilize the plant if it's in soil. It's normal for the leaves to turn yellow and wilt as the plant draws nutrients into the bulb. When this happens, allow the plant to dry out completely. Store bulb in a cool, dry place until Fall when you can plant it in the lawn or garden (fertilize again).

**Project 2: Chromatography** Plants use capillary action to pull water up from their roots. You can use the same mechanism to separate out color mixtures on a filter (chromatography) and make beautiful paper flowers!

1. Draw a thick black circle an inch or two from the center of a coffee filter with a water-based marker. The more ink, the brighter the colors will be! (please protect your table)



2. Fold the filter paper in half, and in half again so it fits in the cup.





- 3.** Put around one inch of water in a tall cup and lower the filter paper in, tip down.



Water molecules are attracted to each other (cohesion) AND to molecules in other materials such as filter paper (adhesion). These forces combine to pull water up through thin tubes or pores in a material. This is called capillary action.

- 4.** Watch as the water carries the ink upward!



The pigments mixed in black ink are made of molecules with different sizes and shapes that are more or less attracted to the paper and water. This causes them to move through the paper at different rates and become separated.

When the color nears the edge take the filter paper out and lay it out to dry.

- 5.** Easy flower: gather up the center of filter and wrap with pipe-cleaner to form stem. You're done!

Or, poke a paper straw through up the center, making a long stem behind and a bit sticking out the front to become the flower's reproductive parts (#6). Bunch filter around the stem and tape to hold in place.



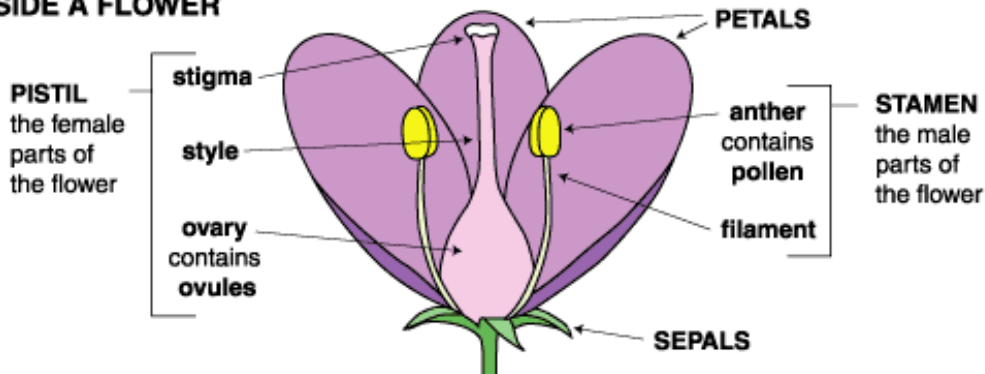
Trim any white filter edge and cut into as many petals as you want. Flowers can have three, four, five, six, even twelve petals!

- 6.** Be creative, and look at photos of flowers for inspiration! A pompom stuck on the tip of the straw makes a good stigma (the pollen-collecting center of the flower that leads down to ovary). A length of straw cut in thin strips becomes a cluster of stamens (pollen-producing parts)



Beyond roots, stem and leaves, there are many interesting plant parts to learn about! Learn more on flip side

Experiment! Try other water-based marker brands and colors. Do all black markers have the same mixture of colors? What does brown separate out into? What do you think would happen if you tried a different liquid, such as milk or honey, as the solvent?

**INSIDE A FLOWER**

Jcook1400

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**More Science Connections**

Bees that make honey and pollinate fruit plants LOVE crocus flowers because they bloom in early Spring when not much else is available. Sadly, more and more bees are dying because of a triple threat: pesticides, parasites, and poor nutrition. How can we help? Use alternatives to pesticides, grow or buy organic produce if you can, and plant lots of bee friendly flowers! See resources below

Did you know that the world's most expensive spice, saffron, comes from crocus flowers? The stigmas (orange parts in the middle of the flower) are dried and used in many parts of the world including Spanish, Persian, and Indian dishes.

Have you heard of a bulb, tuber, or rhizome? They are all different ways that plants store nutrients and energy between seasons. But what's the difference? Bulbs are an underground part of the stem that grows storage layers, like the rings on an onion. Corms like our crocus are similar to bulbs but have no layers. Tubers are swollen stems or roots that can grow whole new plants from buds on their surface (think of potato "eyes"! ). Rhizomes are like tubers only they grow out to the sides underground. Japanese Knotweed is an invasive plant that is taking over greenspaces in Pittsburgh and around the country. It grows fast and can spread quickly using an underground network of rhizomes that send up shoots in all directions. If you leave even a tiny shred of rhizome in the soil it will sprout and spread.

**Resources**

Find out what flowers are most helpful to bees (and butterflies, and birds!)

<https://www.birdsandblooms.com/gardening/garden-bugs/top-10-flowers-that-attract-bees/>

Flower shapes and terms: <https://lizzieharper.co.uk/2019/02/flower-shapes-terminology/>

How to manage invasive Japanese knotweed

[https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_017951.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_017951.pdf)

Chromatography lab you can do at home with plant pigments – what colors are in leaves and what do they do? <https://ctsciencecenter.org/blog/science-at-play-lead-chromatography/>

Any questions? We'd love to hear from you! [team@sciworkshop.org](mailto:team@sciworkshop.org) or 412-568-3062