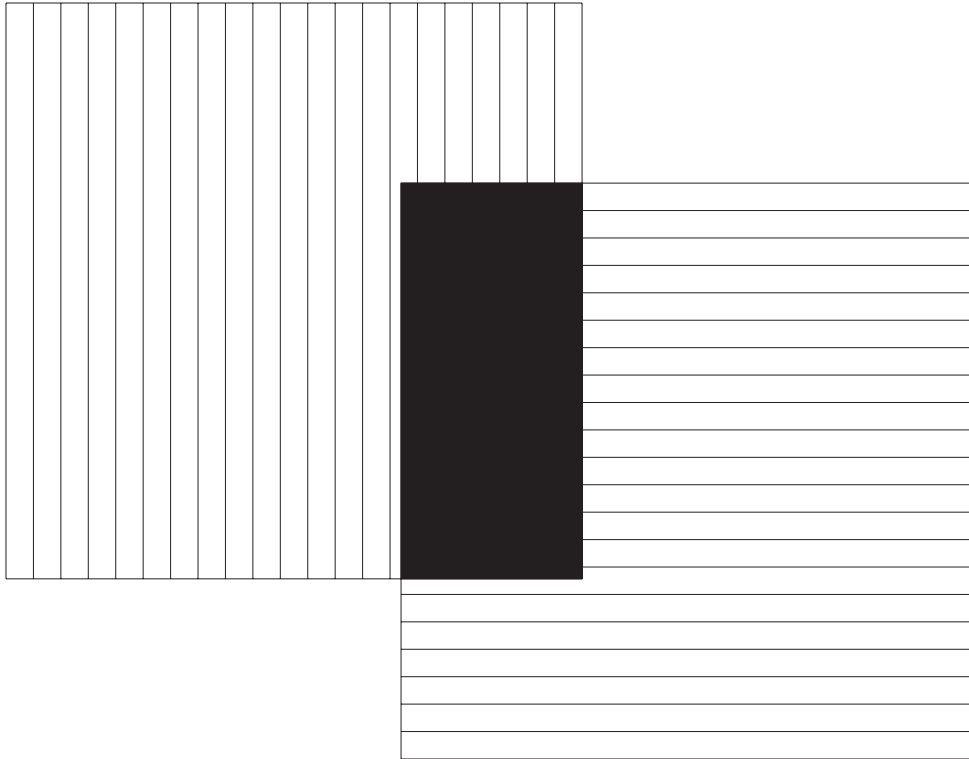


Educational Innovations^{INC}[®]

PF-1

Polarizing Filter Demo Kit



- Materials:
- 2 polarizing filters, 3" x 3"
 - 10 sheets of acetate
 - 1 roll of optically active cellophane tape
 - 1 calcite crystal (Iceland spar)
 - 1 Plexiglas stress tester
 - 1 piece of polyethylene
 - 1 piece of mica



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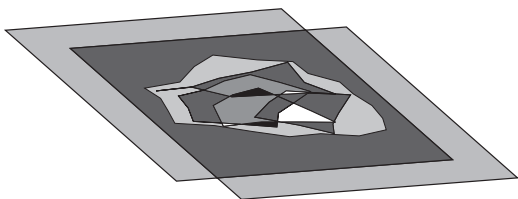
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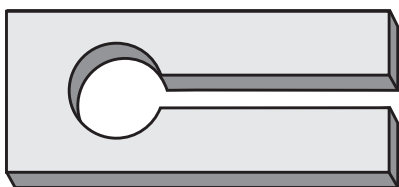
When two polarizing filters are placed atop one another, they can be transparent or opaque to light. By rotating one of the filters, the transmitted light passing through the filters may be turned "on" or "off". When the filters do not transmit light, the polarizing filters are said to be "crossed polarizers". Certain materials such as cellophane tape, Plexiglas, corn syrup, and stretched polyethylene exhibit beautiful colors when placed between two crossed polarizing filters.

Experiments:

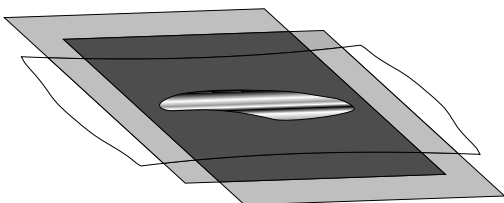
1. Place a piece of mica between two crossed polarizing filters. Each color represents a different thickness of the mica. Try rotating one polarizing filter. Try rotating the mica.



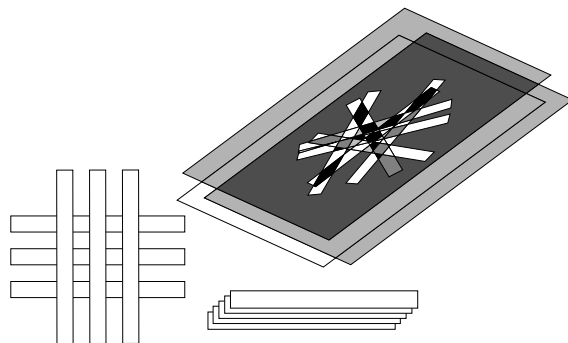
2. When a piece of Plexiglas is placed between two crossed polarizing filters and squeezed, stress lines appear. Engineers use this method to discover the stress areas in new structural designs.



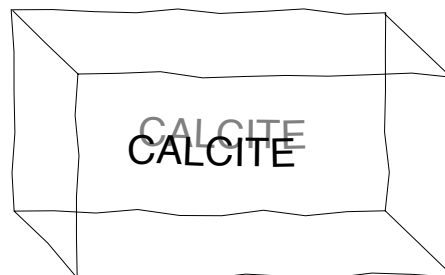
3. Place a piece of polyethylene between two crossed polarizing filters. Then stretch the polyethylene by pulling it. Examine the stretched polyethylene sheet between the crossed filters.



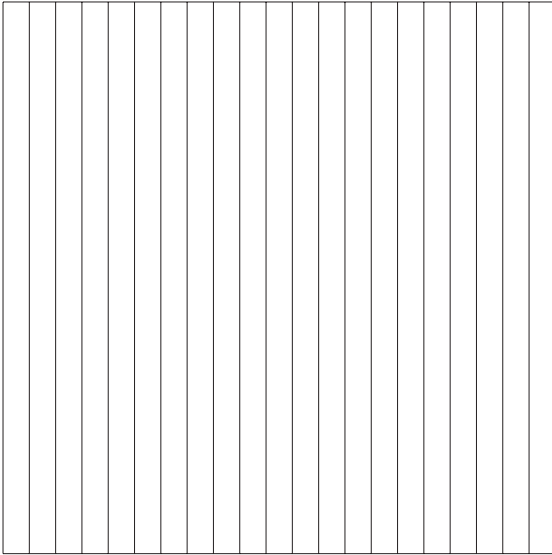
4. Use the special cellophane tape to create designs on a sheet of acetate. Then examine the results by placing it between two crossed polarizing filters. Rotate one of the filters.



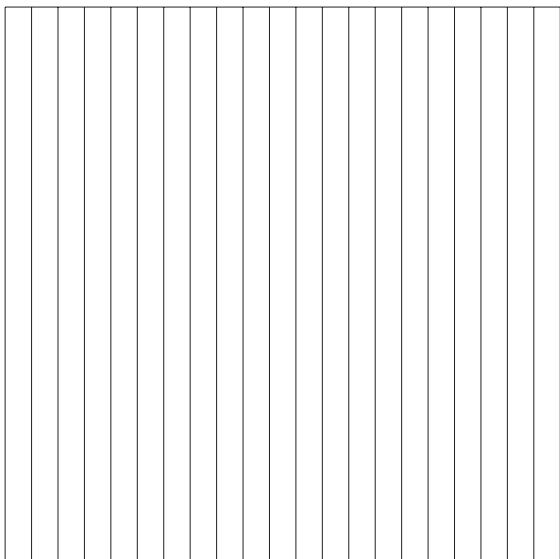
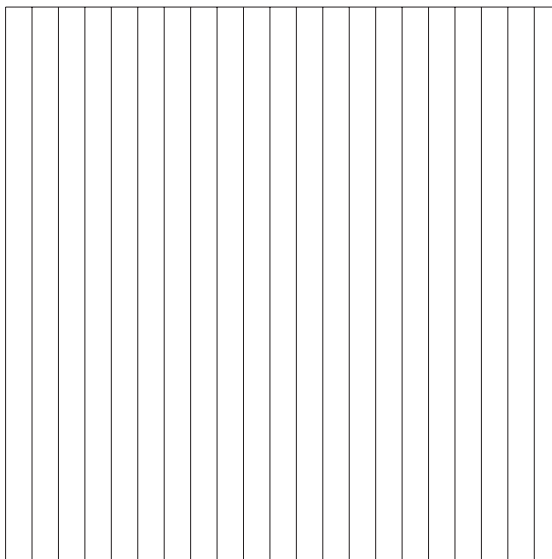
5. If you look at the words on a printed page through a crystal of calcite, you will see double. These natural, nearly transparent crystals exhibit the property of "birefringence", i.e. they break light into two distinct polarized beams. By rotating a polarizing filter over the crystal, it is possible to view one image at a time. This phenomenon can be displayed using an overhead projector.



POLARIZERS



Only vertically oriented light waves may pass through the polarizing filter on the left. Only horizontally oriented light waves may pass through the filter on the right. If the filter on the left is placed on top of the filter on the right, no light will be able to pass through at all.



If the polarizing filters are aligned parallel to each other, light may pass freely through both filters. By placing transparent objects between two polarizing filters, it is possible to identify those materials which rotate polarized light!

Try sandwiching a plastic baggie between two filters and stretching it. When certain plastics are put under stress, they rotate polarized light. Try placing transparent tape between two polarizing filters. Some brands of tape work better than others. The more layers of tape, the more light is rotated.

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