The Prism

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All-included kit for grinding and polishing an acrylic glass prism

Order No. 409.PRI

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This kit contains:
1 prism blank (1 side polished, 2 sides roughly cut)
1 sheet of emery paper grain size 180
1 sheet of emery paper grain size 400
1 tube of acrylic glass polishing paste

Tip: Do not remove the protective foil from the polished side of the prism until the other two sides have been polished.

Grinding instructions (please read before beginning):

Step 1: Using double-sided adhesive tape, attach the rough emery paper (grain size 180) to a hard, very smooth, and even surface. Place one of the rough sides of the prism onto the paper and move it back and forth and in circles, using light pressure. Carry on until the original traces of the saw blade are gone and only the surface roughness from the emery paper remains.
Tip: If you attach the emery paper to a little board, it will be easier to knock off the grinding dust every now and then.

Step 2: Place the other rough side on the emery paper and proceed as above.
Tip: When grinding, the edges of the prism may become so sharp that you could easily cut yourself. You can avoid this by running the edges along the emery paper so that they become a little blunter. Also blunt the edges at the ends of the prism if necessary.

Step 3: Repeat Steps 1 and 2 using the fine emery paper (grain size 400). Keep grinding until the course grooves from the rougher emery paper have disappeared. The more thorough the grinding, the better the polishing will succeed.

Step 4: Now both surfaces have to be polished. The easiest way to do this is to grip the prism ends between the jaws of a vice or clamp. You can also hold it securely between your thumb and index finger. Apply some polishing paste to a soft, fluff-free cloth and polish both sides of the prism using firm, long strokes. Carry on polishing until you get a high-gloss finish and you are satisfied with the result.
Tip: Keep the rest of the polishing paste. It may come in very handy for removing lacklustre or scratched spots from plastic objects, for example watch-glasses, goggles, mobile phone screens, etc.

Now your prism is ready.
If you can't see a difference between the three sides of the prism, then you have done an excellent job.
Congratulations!

Some of the phenomena you can observe with your prism:

Colours can emerge from sunlight or other sources of white light in a variety of ways. Examples include rainbows, extremely thin layers of oil on water, reflection from a coloured surface, or transmission through a coloured filter. Even the blue of the sky is the result of the sunlight being dispersed in the atmosphere. If there was no air, the sky would be black day and night. Dispersion also makes colours appear when light passes through your prism.

The following experiments might surprise and inspire you to find out more about light and colours:

1. Hold the prism horizontally in front of your eye so that one side is parallel to the ground. In this position you should see two images. The lower one is an upside-down reflection of the scene in front of you. The upper one is a distorted picture of the same scene, with the objects showing coloured fringes.
   In which direction is the picture distorted? Towards the edge or away from it?
2. Now rotate the prism very slowly around its long axis.
   In which position do the coloured fringes become most clear?
3. Cut out both of the black and white diagrams on the back of the sheet of cardboard. Place the smaller piece in such a way over the bottom edge of the bigger one that you get Figure A. Look at the edges of the rectangle through the prism. Then push the smaller piece upwards until you get Figure B or C. Again look at the edges through the prism.
   Which colours can you observe on each of the boundaries between black and white? What happens to the coloured edges when moving from Figure A to Figure C? Is there a difference between the right and left side of the picture? What happens to the coloured edges if you turn the figures upside-down?
4. The coloured fringes you observe through the prism are called the "spectrum".
   In the third experiment you found that the spectrum on the left hand side became more well-defined but also weaker when you moved from Figure A to Figure C. The spectrum on the right hand side showed the opposite colours, the so-called "complementary colours". Now look at this spectrum in different types of light: daylight, the light from an incandescent bulb, halogen light, energy saving lamps (fluorescent tubes), yellow street lights (sodium vapour lamps) and others.
   Which type of light produces the strongest colours?
5. Allow a ray of sunlight to shine through the prism and look for the spot where it appears on the wall. This is easier if you are in a dark room. You get the best results if you drape heavy curtains over the window, leaving only a tiny hole for the sun to shine through.
   What colours can you observe?
   Does the appearance of colour change if you carefully turn the prism around its axis?
   Which path does the light take through the prism when the appearance of colours is at its strongest?
6. Now capture the spectrum as it appears in experiment 5 on a white sheet of paper.
   Does it change when you vary the distance to the prism?
   Which colours can you observe when the paper captures the sunlight directly behind the prism?
   Does the spectrum change if you capture the light on coloured paper instead of white paper?

This was only to get you started. We hope you have lots of fun experimenting and playing with your prism!