

# The Prism Kit (409.PRI)

## AstroMedia – Fully functional kits for Hands-On Science

### This kit contains:

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

*Tip: Do not remove the protecting foil from the polished side of the prism until the other sides have been polished*

### Grinding instructions (please read before you start):

**Step 1:** Using adhesive tape attach the rough emery paper (grain size 180) onto a hard, very smooth and even surface. Place one of the rough sides of the prism on the paper and using light pressure move it back and forth and in circles until the original traces of the saw blade have disappeared 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 board and proceed as above.

*Tip: When grinding, the edges of the prism may become so sharp that you could easily cut your finger. You can avoid this by running the edges over the emery paper so that they become a little blunter. You could also at the same time smooth 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 all grooves left over 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 ends of the prism between the jaws of a vice or clamp with the side to be polished facing upwards. You can also hold it tightly between thumb and index finger. Apply some polishing paste to a soft, lint-free cloth and polish both sides of the prism using strong movements. Keep doing this 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 dull spots or scratches from plastic objects, for example watch glasses, goggles, mobile phone displays, etc.*

Now your prism is finished. If you can no longer notice any differences between the three sides you have done an excellent job.

### Congratulations!

### Some of the colour phenomena you can observe with your prism:

Colours can emerge from sun light in a wide variety of ways, although the sun light itself seems to be colourless: in a rainbow, in the extremely thin layer of oil on water, when passing through a colour filter, or when reflected from a coloured surface. Even the blue of the sky is a result of sun light being dispersed within the atmosphere. Without air we would have a black sky, day and night. Colours also appear when light passes through a prism.

Let the following experiments surprise and inspire you to find out more about light and the apparition of colours:

1. Hold the prism level with one side directly in front of your eye and look through it. You see a picture without any particular apparition of colours, which has obviously been produced by reflection and next to it another one with coloured edges. Here the direction of your vision has been changed. In which direction? Towards the edge or away from it?
2. Now rotate the prism very slowly around its long axis. In which position do the coloured edges become most clear?
3. Cut out both of the black and white parts on the back of the German instructions. Place the smaller piece in such a way on the bottom edge of the larger one so that you get Figure A. Look at the edges of the rectangle through the prism. Then push the smaller piece to the top until you get Figure B or C and look at the edges through the prism again. Which colours can you observe at 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 one of the figures by 180 degrees?
4. The apparition of colours which you can observe through the prism is called the “spectrum”. In the third experiment you got a spectrum on the left side which was exactly outlined but at the same time became more and more faint. A spectrum also appeared on the right, this however showed the opposite colours, the so called complementary colours. Now look at this spectrum in different types of light: daylight, the light from a bulb, halogen light, energy saving lamps, fluorescent tubes, street lights (white and yellow), 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. This is easier if you are in a dark room. Try closing heavy curtains or shutters, leaving only a tiny hole for the sun to shine through. What colours can you observe? Do the colours change if you carefully turn the prism around its axis? Which path does the light take through the prism when the colours are strongest?
6. Now capture the spectrum of experiment 5 on a white sheet of paper. Does it change when you vary the distance to the prism? Which apparition of 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 instead of white paper?

This was to get you started. Have lots of fun experimenting and playing with your new prism!

If you would like to try out some more experiments we can recommend the following AstroMedia products which are all connected with the subject of light and colours:

The Hand Spectroscope (406.HSP)	The Diffraction Grating (407.NDI)	The Goethe Colour Glasses (275.GFB)
The Polarisation Filter Film (408.PDI)	The Magic Mirror (452.MSP)	The Stainless Steel Mirror (414.EBS)
The Solar Photo Paper (411.SFP)	OptiMedia Acrylic Glass Lenses (15 sizes and focal lengths)	
OptiMedia Fresnel Lenses (4 sizes)	OptiMedia Glass Lenses (10 sizes and focal lengths)	

You can order these products online at [www.AstroMediaShop.co.uk](http://www.AstroMediaShop.co.uk)