

# The Prism

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 two sides have been polished.*

## **Grinding instructions** (please read before beginning):

**Step 1:** Using adhesive tape attach the rough emery paper (grain size 180) onto a hard, very smooth and even surface. Place the prism by one of its rough sides onto the paper and using light pressure move it back and forth and in circles until the original traces of the saw-blade have gone and only the surface roughness which comes from the emery paper itself 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 along the emery paper so that they become a little blunter. You*

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

In a wide variety of ways colours can emerge from sunshine, which itself appears to be colourless: In a rainbow, in the extremely thin layer of an oil film on water, when passing through a colour filter or when striking a coloured surface. Even the blue of the sky is a result of the sunshine which is dispersed on impacting on the aerosphere. If there were no air we would have a black sky day and night.

And when the light passes through your prism, colours also appear.

## **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 besides it another one with coloured edges. Here the direction of your vision is distracted.

*In which direction? Towards the edge or away from it?*

2. Rotate the prism now 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 this sheet of cardboard. Place the smaller piece in such a way onto 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 to the top until you get figure B or C and then look at the edges again through the prism.

*Which colours can you observe on each of the boundary surfaces 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°?*

4. The apparition of colours which you can observe through the prism is called the

"spectrum". In the third experiment you got on the left side a spectrum which was exactly outlined but at the same time became more and more faint. A spectrum also appeared to the right side, 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), whitish-bluish street lighting (arc lamps), yellow street lighting (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 then look for the spot where it appears. This is easier to do if you are in a dark room. The best results can be got if you close over heavy curtains or shutters, leaving only a tiny hole for the sun ray to come through.

*What colours can you observe?*

*Does the apparition of colour change if you carefully turn the prism around its axis?*

*Which path does the light take through the prism when the apparition 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 apparition of colours can you*

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

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*could also at the same time smooth the front 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 prism at the front between the jaws of a vice or clamp, with the side which needs to be polished facing upwards. But 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 strong movements. Keep repeating 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 lacklustre or scratched spots from plastic objects, for example watch-glasses, goggles, displays of mobile phones etc.*

**Now your prism is ready.** If you can no longer notice any difference between the three sides of the prism, then you have done an excellent job. **Congratulations!**

Colours are the deeds and sufferings of light. J. W. v. Goethe

*observe when the paper captures the sunlight directly behind the prism?*

*Does the spectrum change if you capture the light on coloured paper instead on white paper?*

This was to get you started. Have lots of fun experimenting and playing with your 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** (No. 406 HSP-E)

**The Transmission Grating** (407.NDI)

**The Goethe Colour Glasses** (275. GFB)

**The Polarisation Filter Foil** (408. PDI)

**The Magic Mirror** (452.MSP)

**The Stainless Steel Reflecting Mirror** (414.EBS)

**The Solar Photo Paper** (411.SFP)

**OPTI ✨ Media acrylic glass lenses**, 15 sizes and focuses

**OPTI ✨ Media Fresnel lenses** (magnifying PVC sheets), 4 sizes

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