

## Pupil worksheet

We do not find many square shapes in nature. Most shapes are curved, round, or rounded. This is not an accident.

The shape of objects determines how they behave when an external force is applied to them. Perhaps you have observed tree branches, they look very thin but rarely break in strong winds. We will make some observations to explore how shape effects strength.

### **1<sup>st</sup> step:**

Look for transparent, colourless plastic objects! For example, look for your ruler, a CD case or cellux holder. Do you have another idea?

### **2<sup>nd</sup> step:**

Sit down in front of the monitor and put on the polarized (sun)glasses. In both the screen and glasses there is a called polarized filter that helps filter out scattered light reflected from surfaces.

### **3<sup>rd</sup> step:**

Place the plastic object between the glasses and the monitor. What happens?

Carefully bend the object, but be careful not to break it. What did you observe?

### **4<sup>th</sup> step:**

Take the square films in your hands. Look at this in a similar way to the previous one: held straight and bent.

Now we will examine the effect of making different notches in the films.

### **5<sup>th</sup> step:**

Look for the film cut with a right-angle bend. Pull the film to bend it; gently pull the corners apart. How has the view changed compared to the previous film? Where are the stress points?

### **6<sup>th</sup> step:**

Now comes the film with a quarter circle cut out! Check this out too. What is your experience? How have the centres of tension changed?

### **7<sup>th</sup> step:**

Finally, the film with the curved notch. What is your experience? How have the stress points changed compared to the previous films?

Write your conclusion. How does shape influence tension?