Thumb Tack Cushion

(Ireland)

Background:

Many students and teachers will be familiar with The Bed of Nails Trick. But how does it work? What are the principles of physics that make it possible for someone to safely lie down on one?

The Thumb Tack Cushion can be used to answer to answer these questions as well as being a fun activity. It is cheaper, easier to make and much more portable than the big bed of nails.

You will need:

- ✓ A sheet of A4 squared graph card
- ✓ Laminator and pocket
- ✓ Approximately 400 thumb tacks
- ✓ Piece of polystyrene
- ✓ Glue
- ✓ A balloon
- ✓ Some spare time

Follow these steps:

1. Laminate the graphed card
2. With the piece of polystyrene on one side push the thumb tacks in from the other side. Use the graph lines as a guide to place the thumb tacks as close as possible
3. Use a spot of glue to keep each thumb tack in place
4. Show that one thumb tack would burst an inflated balloon
5. Gently press the inflated ball on the cushion

So what happened?

How come the bed of nails doesn't hurt or the balloon doesn't burst?

Pressure is the force on a specific area or P=F/A If the area is large then the pressure is less. With the cushion the points of the thumb tacks are close together so this is equivalent to a large surface area in contact with the balloon. Not enough pressure is exerted on a single thumb tack for it to penetrate the rubber and burst the balloon.

What next?

- Teachers can place the cushion on a hard chair and gently lower themselves so they can sit on it.
- Students can research how nail mats are used to relive pain and are used for meditation.