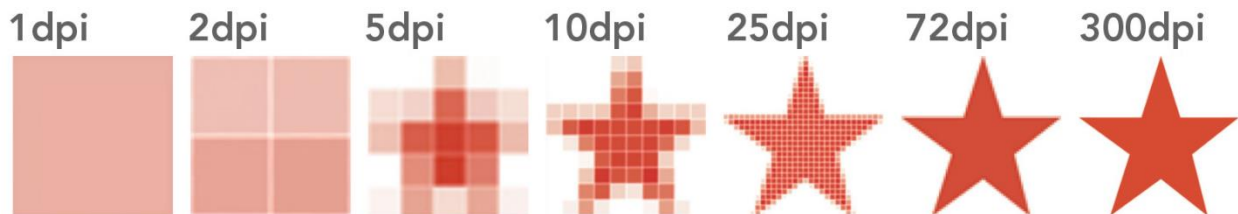


Can you probe shapes with pinheads?

Particle physicists study nature by using particle collisions. High-energy particles have extremely small wavelength and can probe nature at the subatomic level. The higher the energy, the closer particles come to each other, revealing the smaller details of their structure. Particle detectors are used to record the results of these high-energy collisions. Detectors can be thought of as giant digital cameras that are used to “photograph” extremely small particles. The higher the energy of particles, the better the resolution. This activity explains how one can probe shapes with different-sized pinheads and draws an analogy between particle energy/wavelength, resolution, and pinhead size.

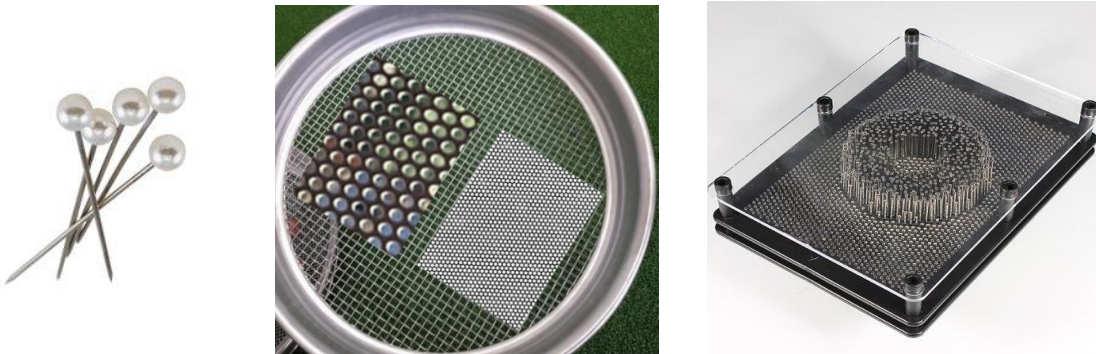


Materials:

Two sets of different-sized spherical pinheads (or round head nails)

Mesh sieve

Small geometric shapes: triangle, disk, square, trapezoid



Activity:

Cover half of the sieve with the large pinheads and half with the small pinheads, as shown in the image above. Take a flat geometric shape and push the pinheads from underneath so that they move up and reveal the shape of the figure under them. Now pick shapes without looking at them, repeat the experiment and try to guess what shape is under the pins.

Questions to ask:

Does the resolution depend on the pin size?

What gives a better resolution? Smaller pins or larger pins?

Useful links:

https://ed.fnal.gov/lsc_exhibits/list.html

<https://twitter.com/FermilabEd/status/1235943216748400642>