DUST STORMS

JANET SUMNER:
We all know what conventional deserts look like…lots of sand nothing much grows there and sandstorms like this. But in places with climates just a little warmer than ours, like Texas, “haboobs” – that’s dust storms started by thunderstorms - are pretty common. But if all that still feels like it’s happening somewhere else, increasingly the effects of sand and dust storms are being felt here in the UK too.

ACTUALITY SOUND MAN:
Oh…my God!

JANET SUMNER:
Understanding what a sand, or dust storm is and how and why they happen may help us to see why the spread of deserts matters very much to all of us.

Here’s my hi-tech apparatus. I’ve got a row of boxes taped together and lined with black paper, I’ve got some sand and a hair dryer! I’m going to make a pile of sand and now let’s see what happens when I turn the hair dryer on.

You can see the current of air coming from the hairdryer starts off by making the sand particles vibrate and then it actually picks up some of the particles and moves them forward. But, it’s not transporting them very far and they don’t stay up in the air for very long. Gravity forces them back down to the surface.

When they land they strike other grains of sand and they transfer kinetic energy to those other grains making them move a bit too. This process is called saltation, from a Latin word meaning to jump. But how do particles get whipped up into the air and stay there long enough to create storms like this?

Unlike the relatively uniform sand that we've got here, sand and dust out in the real world is made up of lots of different sized particles. Some are heavier – like the sand – some are much lighter - like this icing sugar. And it's the interaction of these particles with the wind, but also each other, that creates the dust storm.

In order to see what's happening we're going to have to massively scale up our experiment. So these balls here represent the smaller, lighter particles and this is a heavier sand particle. Now first of all we're going to attempt to move the smaller particles using just the force of the wind, and Tom here is going to be supplying me with some desert wind using a leaf blower, so take it away Tom.

Well you can see what's happening. One or two of the smaller particles have escaped but the majority just vibrated and stayed within the ball pit and that's the problem with small particles, they tend to clump together and are very hard to dislodge. Now I'm going to throw in the big particle and we'll see what happens. Tom…

The weight of the bigger particle impacting on the smaller ones has caused them to be thrown up in the air and blown all over the place by the wind and that is saltation in action. Small dust particles are swept up into the atmosphere and are held in suspension for many days, travelling thousands of miles, and that's sometimes why we get red dust on our cars after a Saharan storm.

So now let's go back to our experiment and try moving some of the icing sugar on its own. Now remember this represents our tiny dust particles. So I'll just make a little pile, switch the hair dryer on and see what happens. Well some of it's moved but the majority of the pile is still here and that's because these small fine particles are sticking together.

Now let’s see what happens if I mix in some of the sand with the icing sugar. And this will make a more natural mix of large and small particles. On with the hairdryer… If you want to do this experiment try using different types and combinations of particles, maybe sugar, brown sugar, salt, flour, whatever you like really, but don’t forget to send us a picture of your best results and we’ll post them up online.