Seeing the Invisible

Learning Outcomes (Understand)

- We can learn about materials without using our eyes
- We can do experiments to create pictures of materials that we can't see with our eyes

Outline

Our eyes are brilliant. We can learn so much about the world around us just by looking. What kind of things can you tell me about this [object: flower / rock / something from the park], just by looking?

[colour, size, texture ...]

There are some things in the Universe that we can't see with our eyes – they're too small, or too far away, or hidden by other things. What things could you tell about an object if you closed your eyes?

[smell, feel, sound ... other senses]

As scientists, we have to use all our senses to learn about our world, and we do all kinds of different experiments to find out about things which are invisible to our eyes, and to take pictures of these invisible objects. We use special cameras and telescopes to see the heat from our bodies, and far away stars. We use microscopes to see things that are too small to see with our eyes.

One very special type of microscope is called an atomic force microscope. It rubs over the surface of a material to find out what it would look like if we could see really really tiny things. We could do the same thing with our hands – rubbing over the surfaces of bark or leaves. What do you think you might be able to tell from that?

[if it's rough / smooth – if it has bumps or holes ...]

What if you want to tell your parents about what you found out by touching the trees? You could describe it in words, but you might forget something! We want to make a picture. By putting your worksheet on the bark, or over a leaf, you can rub over it – and re-create the patterns you feel perfectly. We do the same thing with our microscope, and other experiments: we make a picture of what the microscope sees so that we can study and remember it. This is called imaging.

You've got ten minutes to do two bark or leaf rubbings – try to get different trees and leaves.

Last updated: April 2024

[hand out worksheets]

Now we'd like you to spend a few minutes writing what you can tell from the rubbing you took. Can you see the veins on the leaves?

[Write notes]

Who would like to show us their rubbings?

[Show-and-tell]

Can anybody guess which tree [child] did the rubbing from?

[Guess]

There are lots of different ways we can learn about the things around us. We use our big experiments and microscopes to study the world, but there are lots of things you can do too to make images of different materials. Why don't you make a collage of lots of different bark and leaf rubbings, so you can share the things you've seen and learned today with the people at home?