**Miranda**: Hi there and welcome back to Archaeology Live. Hi, Lucas. Last time we did a lot of reading and we had a nice investigative walk around our site. But now we're ready for some things to get a bit more technical. What have you got to tell us?

**Lucas**: Essentially, we're going to perform a few techniques to perform a geophysical survey.

**Miranda**: A geophysical survey? What on earth does that mean?

**Lucas**: Basically, we're going to use the power of science to produce a map of the archaeological features that lie beneath us on this site. The soil contains all sorts of clues about what happened here in the past, and we'd attack these using special scientific instruments.

**Miranda**: So you want to electrocute the dig site like some sort of mad scientist?

**Lucas**: Well, it might sound a little bit strange, but this will provide us with clues about what materials to expect on the ground, as electricity is conducted through the soil by mineral salts in water. And the more moisture there is, the better the electric current is conducted.

**Miranda**: So what types of things does this let us find?

**Lucas**: Well, an area with more moisture could perhaps be a ditch or a burial whilst things like buried walls or buried buildings, they will hold less moisture and therefore resist currents. We can look at the variations in resistivity across this site and help us map out the underground layout.

**Miranda**: Okay. But what other techniques are there?

**Lucas**: We can make use of magnetometry, which involves taking a look at magnetic forces, working on the principle that the Earth's magnetic field is generally uniform in one place. This may sound a bit complicated, but basically lots of things that people have done in the past, such as moving soil or burning things, end up altering the magnetic properties of the soil. If we measure these differences against the general background of the Earth's magnetic field, we can get an idea of what people did on one specific spot back in the past.

**Miranda**: Okay, so it's a bit like finding or searching for the ghosts of objects that have been gone for centuries. I suppose we could find where something like a kiln or a fireplace once stood. But can you do anything to work out how deep things are like underneath our feet? Because I'm really eager to start digging, but I do not want to spend years searching for stuff.

**Lucas**: Yes, we can actually make use of ground penetrating radar.

**Miranda**: Radar, like the Air Force would use?

**Lucas**: Yes. But instead of pointing it up into the sky, we're going to point it down into the ground. We send down a high energy radio wave and then we measure the time it takes for the signal to reflect back off of things on the ground, whilst also measuring the strength of the returning signal which reveals the details of the ground features.

**Miranda**: So could you use that to plot out where things are buried on site?

**Lucas**: Yes, certainly.

**Miranda**: So you could actually make a treasure map and then you can use it like some sort of high tech pirate?

**Lucas**: No, archaeologists do not use treasure maps. However, if we were doing some underwater archaeology, then we could also make use of sonar, which involves measuring sound waves, bouncing off of structures underwater, giving information about their depth and form.

**Miranda**: Thankfully, our site's not under the sea, so using a mixture of historical records, scientific techniques and good old maps, it sounds like we can get a really good idea of what the site is like underground. So does that mean that we're finally ready to start digging?

**Lucas**: Well, yes, but don't get too excited! We’re going to first dig some small test pits which are only a one metre square trench.

**Miranda**: Well, it's a start, I suppose, and because of all the reading and surveys we've done, we know where the best places are for those little dig pits.

**Lucas**: Exactly. And this test pit will give us an idea of the stratigraphy of the sites as we analyse the order and position of the layers of the archaeological remains. These layers vary between different dig sites in their depth and their complexity. As a general rule of thumb, the older layers are deeper underground, and the more recent layers are closer to the surface.

**Miranda**: Well, it's a start, I suppose, but I guess all the endless reading and surveying that we've done, we now know the best place to put those little dig pits.

**Lucas**: Exactly. And this test pit will give us an idea of the stratigraphy of the site as we analyse the order and the position of the layers of different archaeological remains. The layers will vary between different dig sites in their depth and their complexity. As a as a general rule of thumb, the older layers are going to be deep under the ground, whilst the more recent layers are closer to the surface.

**Miranda**: You're making it sound like the soil is a cake, and the test pits that we're digging reveal the order and thickness of the Victorian icing and the Viking jam and the Roman sponge.

**Lucas**: Yes. And the test pit also reveals the nature of the soil on the site and gives us an understanding of where features are and their relationship within the wider site context. And of course, the test pit reveals how deep the remains that we're investigating actually are, and therefore how much time and work it will take to access them.

**Miranda**: Great! So it sounds like we know what the landscape looks like both above and below ground, and we now know the ideal spot to start digging that will make the best use of the excavation’s time and resources. Does that mean we can finally start digging?

**Lucas**: Yes, it does! Let's dig!