Family show briefing sheet

Show title:
Operation Earth

Target audience and age group:
Families with children aged 6 to 11 years old

Typical show length:
35 minutes

Key messages:

- Environmental scientists help us understand our changing planet.
- Research over a period of time helps us identify patterns of change.
- There are a broad range of skills and areas of interest that environmental science covers.
- There is a role for everyone, from fieldwork to engineering, data analysis to satellite applications.
- Everyone can investigate and explore their natural environment.

Overview:

Earthy is feeling a little under the weather and is going to the doctors for a check-up. Join us together with the help of expert scientists, as we investigate what is bothering Earthy. Become a trainee environmental scientist and help us investigate Earthy's land, air and oceans, and see if together we can identify and find solutions to Earthy's problems.

Operation Earth script

Introduction

Slide 1

Doctor (intro): Hello and welcome to (insert centre name) science centre.

Doctor: I'm Dr (insert name) how are you all today?
(audience replies positively).

Doctor: (confused) Oh, how are you?
(picks out individual audience members and receives more positive responses from audience. If someone replies and they are not so well, respond with: well you are in the best place and hopefully you will feel a little better after this).

Doctor: This is very odd, most people who come to see me aren't very well.

Doctor: Oh I remember now I completely forgot, you must be the trainee environmental scientists, you seem to get younger every day.

Doctor: I'm glad you've all turned up today as I have a VIP due in for a check-up.

Slide 2

Intercom: (pre-recorded snappy voice) Doctor your first patient is here.

Doctor: Yes, show them in.
(Earth walks in).

Earthy: Hello doctor, umm who are all these people?

Doctor: These are my trainees, you don't mind them joining us today do you. (giving Earthy no time to answer).

Trainees let me introduce my VIP, Very Important Planet, Planet Earth.

Slide 3

Doctor: Now you're here for your check up. Gosh you've got a long record, previously had asteroid strikes, various eruptions, and more recently acid rain which I see has nearly cleared up. You also have a hole in your ozone in the southern hemisphere which must have given you a very painful bottom.

I can see that last time you were running a temperature with some signs of climate change, a very complicated issue. Let me just see how that temperature is doing.

Doctor: So how's is your climate?

Earth: Um it's ...

Doctor: (distracted) That's great.

Doctor: Hmm, looks like you're still running a temperature, so I would like to run more tests because we need to see if you have any other symptoms that are related. Sometimes whilst we are focussed on treating one thing we can miss or even cause other issues. Now have you noticed any other symptoms recently?

Air pollution

Earth: Well I'm sure you're really busy (starts coughing) It's probably nothing (more coughing) but I have had this cough, maybe 200 years or so, not very long anyway.

Doctor: 200 Years! Not long!

Earth: Well I am 4.54 billion years old, so it's not very long for me. By your standards, if I was 200 years old I would have had the cough for less than an hour.

Doctor: OK, well when you put it like that, it has come on quickly. Well this is what I'm here for so let's take a look at that cough. (Doc gets out stethoscope).

Keeping you healthy is important for all of us, so we need to check all your environments carefully - it's called environmental science.

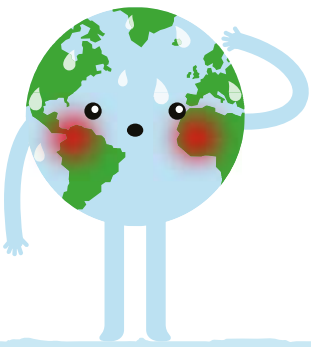
Can you take a deep breath in for me...hold it...hold it...now breathe out! And in again...

OK, as you know, the air that is all around you is contained within a thin atmosphere. Now it seems as if there is something in your air that could be affecting you. We should take a sample I think.

Earth: A sample? That doesn't sound good!

Doctor: Not to worry, I'll just get the sensor!

Earth: A sensor - that sounds even worse...



Slide 4

Doctor: Just relax, a sensor is just a tool that helps us find out what's in your air.

I have a sample taken 200 years ago (holds up large card or show image on screen of sample), but we need one from today, so that we can see what has changed.

For this, I'm going to need a help from one of our trainees!

Hello, what's your name? You are going to help us test the Earthy's air quality today, to see if there is any pollution.

Now sensors can often look like this (show image) which detect lots of different air pollutants, but they are quite small and it is hard to see what's going on, so today we are going to use a sensor that is much bigger...you!

Now, in there is a sample of some of the Earth's air from today (suggest it is local) that we need to measure. To do this we'll give you some special equipment (give goggles, facemask and net).

Right now you're ready, so if you'd like to step into our air sampling laboratory and when I say go: I want you to collect as much of the air sample as you can, then we can take a closer look at what you've found in the air? Let's have a countdown from everyone 3...2...1... GO!

Earthy: Woo hoo! Come on out! That looked like some excellent sensing was going on there. Let's have a look at my sample AGHHH LOOK AT ALL THAT!

Doctor: Earth, please try to relax! Let's compare what our sensor has found to the last time we measured you.
(previous sample mounted on a chart or on screen).

Slide 5

Doctor: So...we've got some oxygen (white pieces: hold it up) which is important because it's what we breathe in, nitrogen (blue pieces: hold them up) which again is absolutely fine, a majority of the air we breathe is made up of nitrogen gas, some carbon dioxide and we've got some other naturally occurring gases in our air too, but they're a very small part of the air we breathe (red segments). Now it looks like you have more carbon dioxide in your atmosphere which could explain why you are running a temperature. But hang on... ohhhh dear...

Earthy: What! What! WHAT!

Doctor: We also have these other things: we've got all this black stuff which look like tiny dots or particles.

Earthy: So what does this mean?

Doctor: Well let's take a look at the measurements from 200 years ago, and get one of our trainees to tell us what they think about these new measurements.

Ideally they will highlight the below ...

Yes, from the looks of these measurements it looks like there are still some harmful gases, but not as much as there used to be, which is good news, but hang on, we've got a lot of these black dots or particulate matter.

Earth: More dots or particulate matter...does that matter? Where did that come from?

Doctor: Good question. The best thing to do would be to speak to one of our experts, an environmental scientist that studies the air around us.

Slide 6

NERC Scientist Video: Hi. My name is (insert name) and I'm an air quality scientist, a type of environmental scientist that studies what's in the air.

I keep an eye on the pollution in the air and try and work out where it has come from, so we can find ways to reduce it.

Thanks for getting in touch, the more information and measurements we have the better – I'm just having a look at your new air measurements now.

Interesting. Well, first of all there are fewer harmful chemicals than there were 200 years ago, thanks to research and changing our actions, but there's still more than we would like.

These tiny dots called particulate matter are worrying though. You see it can be really harmful for living things. It is so small, it's smaller than a grain of sand, and if you breathe these in, it can lead to serious health issues and damage your lungs.

But the good news is that our research is helping us get to the bottom of it, and work out where it is coming from.

A lot of the particles are coming from cars actually - from exhaust fumes, from the tyres, and from the road. Some of it also comes from factories and farming.

The increase in carbon dioxide levels is also concerning as this can act like a blanket and stop the sun's heat from escaping, making the planet warmer.

The carbon dioxide increase can be linked to the increased number of cars and factories.

The more information we have to work out exactly where this particulate matter and carbon dioxide is coming from, where it is worse and where it is better, the more ways we can find to keep it out of the air, like producing cleaner cars and factories. Which is why it is great to have your latest measurements!

Anyway, good luck, and keep up the good work.

Doctor: So what do you reckon we can do to help trainees? (asks the audience)

(Get them to suggest things, rather than we tell them what to do.)

Great ideas, (list ideas e.g. more public transport more cycling, sharing cars, using ecofriendly cars and walk in the beautiful outdoors etc.!)

Ocean pollution

Doctor: Excellent!

Doctor: Ok, so we've taken a look at the health of your air, it's probably best that we check your water as well. I mean look at you, you are mostly water after all. (Earth spins around so we get a good look). All life on earth depends on water, so I think we should make sure that your water is nice and healthy and full of life. What do you think everyone? (Directed at audience).

Earthy: Ok no problem, how are you going to do that?

Doctor: Well it's hard to tell without a closer look, so we are going to need a sample I think, just pop behind the curtain over there and see if you can fill this pot. (Holds out a tiny sample pot).

Earthy: Um, I don't think that's going to be quite big enough.

Doctor: Really? Ok. Well, there are some other containers in there. (Waves Earth away. Earth trundles off behind the curtain, then sounds of waves crashing or waterfalls).

Doctor: Everything all right in there?
(Earth emerges from behind the curtain pushing a fish tank full of water and a collection of different types of ocean plastic, including a few comedy items. Key items include plastic bags, plastic straw, and fish).

Doctor: Thank you Earthy. Ok let's take a look. Hmm, there's a lot in there, I think I'm going to need some help. Can I have help to assist me from one of our trainees please?

Hello, what's your name? OK (insert name) first, can you put these on.
(Give the volunteer a pair of goggles).

OK (insert volunteer's name) I would like you to do one piece at a time, fish out some of the large floating bits from the water and hold them up so that the audience can she them. (Depending on the item that is pulled out use the corresponding script).

Fish

Doctor: Ah ha, you've found a fish. Well done, that's great news. These represent the fish that are safe in our protected marine areas and the work that is being done to protect our fish. Hands up if you like fish and chips. Well the North Sea cod almost went extinct because we were fishing too many of them. Luckily environmental scientists realised in

time and so they could make sure that fishering companies stopped taking so many and allowed their numbers to grow again.

Earthy: So that means there are more fish in the sea for fish and chips?

Doctor: Well, more importantly, more fish in the sea means more food for other animals, and more life in the ocean generally. An ocean full of life is also good news for your climate change as well, because all the animals and plankton in the ocean trap carbon dioxide, one of your greenhouse gases.

Earthy: Great – well in that case, I think we should put it back in the ocean then.

Doctor: Yes probably best. The most important thing is that we keep an eye on the numbers of the animals in the ocean and identify any changes taking place so that we can find solutions that will help.

Plastic bag

Earthy: What's that? A jellyfish?

Doctor: That's what a lot of turtles think unfortunately. It's a plastic bag. The good news is that in some countries, like this one, they're not free any more so people aren't using as many. But there are still too many being used.

Earthy: How many?

Doctor: Oh, about a trillion per year.

Earthy: (Takes calculator from desk and punches some numbers in)
That's 2 million a minute. Wow. Why are there so many?

Doctor: They only get used once. They're err...disposable.

Earthy: You mean they're disposing of them in my oceans?

Doctor: Not directly, but yes. That's where a lot of them end up breaking down and adding to the plastic soup.

Straw

Doctor: Let's see what else is in there. (Volunteer pulls a straw of the tank).

Earthy: What's a straw doing in there? Is someone trying to drink my seas? What's wrong with straws?

Doctor: Well they kind of suck. We generally use them once and then they end up in the sea where they break down and get eaten by sea life. So we really need to use less.

Earthy: That really does suck.

Micofibres

Doctor: Well things certainly look a bit better now, as we want less of this in the ocean (holds up the plastic), and more of this (grabs fish out again). So big round of applause to our volunteer. (send volunteer back).

Earthy: Is that everything then?

Doctor: I'm not sure, actually, because some things are really small, so let's look under the microscope. (Uses a pipette to take a sample and make a slide. Puts slide on microscope and peers through).

Doctor: Hmm, there's something else in there. (Slide appears on screen showing microfibre).

Slide 7

Earthy: I've got worms as well?

Doctor: No, it's much worse. You've had too much fibre.

Earthy: I thought fibre was good for you?

Doctor: This is plastic fibre. It's not good for anyone.

Earthy: How did that get there?

Doctor: They're shed when people wash their clothes made from artificial fabrics like acrylic, nylon and polyester, and even fleeces.

Earthy: They're made of plastic?

Doctor: Yes. Fleeces are made from recycled plastic bottles.

Earthy: That's a good thing isn't it? Recycling?

Doctor: Definitely. Recycling is a great way to keep plastic out of the oceans, and turning single use plastic bottles into fleeces is a great idea. But microfibres break off in the wash which then gets into the waterways.

Up to 700,000 microfibres get released every time clothes are washed. They end up in rivers not just oceans. 85% of human made debris on your shorelines are microfibers.

Earthy: (sighs) So what can you prescribe for that then?

Doctor: There's a new treatment that should be available soon that scientists have helped make. It's a type of fabric ball. Pop one of these in with your clothes and it will trap any escaping microfibres.

Earthy: Big bits of plastic, small bits of plastic, now worms: I mean microfibres. How long have I got Doctor? Be honest. I don't want to be a barren, lifeless place. Have you seen Mars lately? They call it the red planet but it's just so beige. Is there anything you can give me for it Doctor?

Doctor: Hey, hold your sea horses. There is a lot that can be done to help. Let's see what one of our experts has to say...

Slide 8

Environmental scientist

Hello I'm...(general introduction of what he / she does)
There are a number of problems that our oceans are facing, some you can easily see and others you can't. The increase in carbon dioxide in the atmosphere is causing the ocean water to become more acidic, affecting life within the ocean such as mollusks (creatures with shells) and corals. But the effects are not so visible unless you study them over time.

A more visible issue that we can all see is the problem with plastic. Once it's in the water it breaks down into a plasticy soup, and it is difficult to remove from the ocean. What environmental scientists like me can do though is look at exactly how the plastic is affecting the animals that live in the ocean. Then we can have a better idea of how we can help.

Thanks to our research we now know plastics are eaten by sea creatures which then may end up on your plates at home. This issue is even more concerning as the pieces of plastic absorb toxic pollution in the sea and can make anything that eats them very ill.

At the moment we don't have all the answers for the problems our oceans face, so our research ships and remote subs are busy studying the oceans to find out more and work on new solutions.

For now though, the easiest thing you can do to help our oceans is to stop the plastic getting to the ocean in the first place.

Doctor: (scribbling on a pad) Ok so I'm going to prescribe a clean up to try and help.

(To audience) Trainees, earthy is going to need your help for this. There are lots of local projects taking place including beach or park cleanups.

Here at (insert your centre) we've heard about something called 'one piece a day'. Just pick up one piece of litter every day and place it in a bin: if we all did this thousands of pieces of litter would stop washing into our rivers and seas. You can even post a photo of what you find on social media with the hashtag #OnePieceADay. If possible try to recycle what you find.

Low Biodiversity

Doctor: So, we've checked your air and your water, now have you got any other symptoms?

Earthy: Ok well I've been feeling kind of low...I can't really describe it, it's as if something's missing. (Earth rubs its side).

Doctor: Yes you don't seem quite yourself! Well let's have a closer look at you, using some of our amazing equipment, that has been carrying out regular monitoring of the state of your surface.

Slide 9

(Earth Observation images up on PowerPoint, a before and after showing deterioration of the environment: lack of biodiversity)

Earthy: Hey, I didn't know anyone was taking those! That's not my best side...

Doctor: Lucky for you they were: scientists can learn a huge amount about the planet from hundreds of miles from your surface... By using satellites and even drones now - this is called Earth Observation.

These satellites and drones can carry amazing cameras and sensors, and other clever equipment. They can fly at great speeds around you, inspecting you from all sides, near and far.

Earthy: (looking at images on the screen) Hang on those two look very different, what's happened there? That one doesn't look too good!

Doctor: Hmmm you're right. I think we are going to need a second opinion on this as it isn't my speciality. Luckily, I know just the person...

Slide 10

Expert: Hello, I'm (Insert name) and I'm a type of environmental scientist called an ecologist. I spend a lot of my time outside looking at different environments, checking their health and identifying different species of plants and animals, including insects.

Looking at those photos, it looks like you have biodiversity loss in some areas.

This means that where there should be lots of different plants and animals, you have only a few. So you were right when you felt like there was something missing.

Having high biodiversity, (lots of animals and plants) is really important. It keeps you, the planet, fit and healthy, and means there is plenty of food and water for everyone. Each animal and plant has a job to do in the environment, and has its own habitat that it lives in.

The good news is that with environmental science we can better understand why you have low biodiversity in some areas, and then do something about it.

Now your low biodiversity could be being caused by a number of things, but generally it is because humans have interfered with the environment somewhere.

One problem we've been investigating is something called pesticides, especially neonicotinoids. These are types of chemicals used to control insects that eat the food we grow. Unfortunately they can also affect insects that we need to keep, including our pollinators such as bees. Oh and climate change doesn't help either. The change in your temperature can affect when and where plants can grow.

So we really ought to try to help our pollinators and in turn increase biodiversity.

People can all help:

People can count and monitor insects using mobile phone apps, or can help restore natural habitats.

My top tip would be to first attract more insects. They are the basis of all healthy and diverse environments.

Good luck!

Earthy: Insects! Those things buzzing round all the time. Why do I need them?

Doctor: Well they may be small, but they have a BIG part to play, carrying out lots of really important jobs to keep the environment healthy.

Earthy: Oh yeah, like what?

Doctor: Let me show you. Can I please have 4 willing trainees to help me demonstrate this to Earth? Round of applause please.

Excellent, ok, you are a honey bee. Bees are important pollinators and we often see them busy at work. (Hand out antennae, wings and pollinator collector).

But we want other types of insects too, so we're not relying on just the busy bees, and because they don't pollinate everything, so you are a fly. (Hand appropriate wings and antennae).

And I think we could do with a butterfly or moth too, as they are also useful butterflies, (and they are nice to look at too) – so you are a moth, which is good, because we can even keep pollinating during the night. (Hand appropriate wings and antennae).

We also need one more pollinator for our activity today, so you can be a wasp. People generally think of wasps as pests that sting you when you are having your picnic, however they are also an important pollinator. (Hand appropriate wings and antennae).

Slide 11

Doctor: So why are insects important? Well they are food for lots of things, they clean up waste, they control pest populations, and they are pollinators of course.

In fact, did you know 80% of plants in the UK are pollinated by insects, including lots of crops that all humans here depend on for food?

So more insect pollinators means more plants and more food, and so more biodiversity!

Earthy: Ok, that sounds important, how does that work?

Doctor: Let me show you. So this is our current biodiversity level in some of those itchy patches, (brings out pollinator / biodiversity tube).

Not great really is it - we need to improve it I think. But I'm going to need some help from some insects, more specifically from insect pollinators...

So our trainees / insects are our very important pollinators and their job, when I say go, is to collect as much pollen as possible from our plants, using their sticky pollen collectors and put the pollen into the right bucket, I mean flower over here. You'll have 30 seconds, so you better be quick.

Our Bee is attracted to flowers represented by the (choose colour) flower and can only collect pollen from the (choose colour) flowers, our fly has to stick to the (choose colour) flowers, and our butterfly (or moth) to the sweet smelling (choose colour) flowers. Our wasp can fly between them all and collect pollen from any of the flowers.

Earthy: Pollinators are you ready – 3, 2, 1 go pollinate. (Maybe do pollination commentary, adding in a few facts, after 30 seconds signal for them to stop).

Doctor: Fantastic work everyone, let's see how you did. (Pick up the bees bucket and pour into the central pollination tube).

Excellent stuff, thanks to your pollination our biodiversity is already looking a lot better in this area. Also, we get all these lovely foods thanks to pollinating bees (image on PowerPoint). (Pick up fly bucket and pour into the central tube).

Brilliant stuff – fly pollination has really helped too. Also, without flies, we wouldn't get chocolate as they help pollinate cocoa plants!

Our moth has been busy too and collected lots of pollen over the night (pick up bucket from moth and pour into central tube).

Ok and finally our wasp, our general pollinator has been busy collecting pollen from a range of flowers. (Pick up bucket from wasp and pour into central tube).

Superb, when we add all the work by the different pollinators together, our biodiversity level is looking much better than it was.

Round of applause for our pollinators again – they are real biodiversity heroes. (Volunteers sit back down).

Earthy: So, it is quite clear, I need more insects and more plants being pollinated. Where can I get more insects from? Can you order them for me?

Doctor: Well it's not as simple as that I'm afraid, to get more pollinators one of the things we can do is to plant flowers that will attract and feed the insects. This is something our trainees can help with though. They can also help our scientists by recording what they see. The more records we have, the better we understand what is happening, and the more we can do to help.

Summary and ending

Earthy: Thank you Doctor.

Doctor: Well I think we've given you a really thorough check up today. We've looked at the health of your environment, your air, water, and land quality.

Slide 12

Earthy: So on top of my increasing temperature, you've told me that I have reduced biodiversity, air pollution and my oceans are filling up with plastic, things are pretty bad I guess?

Doctor: Well a lot of these conditions are linked. So if you treat one, it may help your other symptoms, and as we said earlier there are things that can be done to help. You have a team of environmental scientists with amazing equipment and technology monitoring all of these conditions and more, which helps us come up with better ways of keeping you healthy.

These scientists have already helped begin to restore you. Remember the hole in your ozone layer, we stopped using certain chemicals and now it is recovering nicely. Remember your acid rain issue, well by filtering out certain gases escaping from industry and vehicles we managed to reduce that and you're a lot better now. Environmental scientists are working to tackle your temperature increase which is changing your climate and there are all these fantastic trainee environmental scientists in the room, who can help you feel better with simple actions.

Now just remember to take your prescription. Here you go?

Wait a minute... We shouldn't really give this to you, really I should be giving it to our trainees (point to the audience).

You've now all had your basic training in Earth care, you can now join our environmental scientists as part of the Operation Earth team.

Don't forget you can continue your training at www.operationearth.co.uk or by taking part in our activities just outside.

The Earth and I will be around to answer any questions.

Slide 13 – end slide

Additional section/activity

Melting polar icecaps

Doctor: Okay Earth! I think we're getting somewhere, we've looked at your oceans, air and your biodiversity. now, was there anything else you wanted to have a chat about?

Earthy: (moves hand towards head/north pole and starts rubbing) Well...I've noticed some thinning... just here.

Doctor: Thinning? Okay. Well I guess we should probably take a look at that as well. So from where you're showing me, it looks like this is happening in the north pole/the arctic circle?

Earthy: Yeah...It's been getting particularly bad over the past fifty years or so. At first I wasn't that worried about it, I get some thinning throughout the year anyway – I have more ice at some points each year and less at others you know?

Doctor: Yes, that's right, you tend to have a bit more sea ice cover in winter, rather than summer - you have some natural fluctuation throughout the year.

Earthy: Yeah, that's what I thought ...but... now I seem to be having less than I used to... most of the time. I'm thinning more and more... and it's not coming back and I don't want my north to be bare!

Doctor: Okay. Well let's have look. I suspect that this might be related to your on-going climate change, but just to be sure...let's get the advice from one of our expert environmental scientists.

Additional slide

Polar scientist: Hi there! My name is (insert name) and a type of environmental scientist called a polar scientist. In my job I get to work in both the north pole (or the arctic) and the south pole (antarctica) to understand how the polar regions of Earth are changing, and what these changes can tell us about the health of our planet as a whole.

One of the things we know is happening is our planet is getting hotter, and almost all scientists agree that this is because of rising concentrations of certain gases being released into Earth's atmosphere. The gases that cause this are called greenhouse gases, and come from things like factories and cars. These gases trap heat from the sun in our atmosphere, and cause the temperature of Earth to rise.

This is a big problem for the polar regions of Earth, because as we all know, hotter temperatures cause ice to melt. Melting is having and will continue to have a big impact on the polar regions, affecting our penguins in Antarctica, and our polar bears in the Arctic, as well as the changing the level of the sea.

I think you should investigate how the gases are warming up the Earth and ask your trainees what they think can be done to help.

Earthy: Greenhouse Gases?

Doctor: Yes, so we were right, it is tied into your climate change. Let's look at how those greenhouse gases affect you. I'm going to need a couple of volunteers... (choose two volunteers).

Doctor: Hello, what is your name?

So our story starts with the great big thing in the sky that gives us all of our heat and light energy. Who in the audience can tell me what this is? The Sun! Fabulous. (insert name) can you be the sun for me (hand volunteer plush/inflatable sun)

Earthy: I do like the sun. It helps me stay nice and cosy.

Doctor: It certainly does! But we need something else to help trap that heat which keeps you at the temperature you like to be. Can anyone remember the name of the special layer of gases that surrounds Earth and helps us with this? (gesture around Earthy).

The atmosphere! Well done.

Earthy: So those gases are all around me?

Doctor: They are!

Earthy: Ah I see.

Doctor: So! (volunteers name) can we get you to wrap up Earth in our atmosphere? (Hand volunteer flexible mesh sheeting and help wrap Earthy up in it. Spin Earthy as you wrap it around).

Earthy: I don't like this. I feel very dizzy!

Doctor: We'll take it away soon, I promise. Now, in our atmosphere we have naturally occurring greenhouse gases. These are gases which help trap the sun's energy, and without them, we'd be so cold and life on Earth wouldn't be possible! You may have heard of some of these gases before, they're things like carbon dioxide and water vapour.

Earthy: And they help keep me warm.

Doctor: Exactly! Those naturally occurring greenhouse gases are really important. They keep you the temperature you like to be, a bit like having a cosy blanket wrapped around you! (Give volunteer the blanket to wrap around Earth).

Earthy: (Sincerely and sweetly) Aww – thank you!

Doctor: BUT there's a problem. Like our polar scientist said – scientists have found that over the past century, we've been putting even more greenhouse gases into the atmosphere, and what do more greenhouse gases mean?

Earthy: I get even warmer!

Doctor: Yes! You get even toastier – a bit like having an extra blanket wrapped around you that raises your temperature (Give volunteer another blanket to wrap around Earthy) – a bit like this.

Earthy: Ok I'm definitely feeling the heat now, um can we stop now please. (From underneath the blanket).

Doctor: Let's give a round of applause to our volunteers. Thank you very much. Earth let's get you out of all of this...

Earthy: (Looking unimpressed) Thanks. So my global warming is causing my ice caps to melt, and that's what's giving me my thinning?

Doctor: Yes, I'm afraid so. We should probably take a look at the images our polar scientist sent through...so here's one from 1960...and here's a much more recent picture... Oh did we all see that?

Earthy: So where is the ice going?

Doctor: Well...the ice is melting and becoming water. This water adds to the water in the sea! Any ice that melts on the land then runs into sea and causes the sea level to rise increasing the risk of flooding. This is why environmental scientists are monitoring this so carefully.

Earthy: So what do we do to stop this? How do we stop my thinning?

Doctor: Well, environmental scientists are working hard to monitor and understand how climate change is impacting upon lots of different parts of Earth, including the polar regions like the arctic. The evidence they gather helps us make decisions about how we can reduce greenhouse gas emissions.

(Ask audience what they think we could do?)

Doing really small things like walking or using public transport instead of using the car, recycling more often or thinking about how much energy we use in our homes will all have a really big impact as well.

Earthy: That sounds like it could be a plan to me.

Doctor: Good stuff. We'll continue to monitor it with the action that's currently being taken, but we may need to step it up a little bit in the future. But let's see how things go.