

How can I engage families with science and research?

Families are an exciting audience group to work with. This guide will help you plan and incorporate engagement techniques that will inspire and engage the whole family, from ages eight to eighty!

1 | What do we mean by a family audience?

There are lots of definitions of families, but in most cases family audiences are defined as intergenerational groups composed of at least one adult and one child.

It's important to remember this definition, as it means family engagement is not just children's engagement. We think the best family engagement happens when you **engage the whole family together**. It's easy to think that a family activity is one where adults are passive, watching their children doing something, but your activity should **aim to engage adults and children at the same time**. This could be actively learning together as a group or it's something they can all enjoy individually, but we think good family engagement is where the whole family takes part.

2 | Why work with a family audience?

Working with families is really rewarding for lots of reasons, but here are some that stand out for us:

- Family audiences often make up some of the most diverse audiences in the cultural sector. By working with families, you can find yourself engaging with adults who, without children, might not usually seek out science engagement. Additionally, you can reach younger children before they decide science is "not for them". Many adults still think of science as boring science lessons from school, so it's great to show adults that science can be fun and relevant.
- It will get you to think about and explain your research at different levels. Communicating your ideas to a four-year-old, an eight-year-old and an adult makes you really think about how to explain complex ideas in different ways and how to speak about research for a non-expert audience with different levels of understanding.
- It might sound clichéd, but you can provide great experiences that families will remember for a long time. By enabling them all to take part in something together you are helping them meet their needs to do something positive as a family unit, to interact and support one another towards a shared goal. This can have as much impact as the activity itself.
- You'll get great questions from children in a family dynamic. Children often have less of a filter and are really curious about you and your research. Adults are often as curious, but much shyer when asking questions, so you can use the curiosity of the children to bring in the adults.

3 | Top Tips

Engaging whole families all at once can be a challenge (albeit a fun one!). Here are some of our top tips for family engagement:

- Consider what you want families to come away with. In the cultural sector, these are often called the **generic learning outcomes**. This could be a new skill (like using a microscope), a greater understanding of your research or of a scientific principle, or just a new, more positive attitude to science or research.

Although some outcomes might be the same for the whole family, you may want some differentiated outcomes for adults and children. If all your learning outcomes are things the **adult already knows or can do**, they might not engage. By considering outcomes **for adults and children** you are ensuring that all participants gain something from the session and this will make it easier for everyone to stay engaged.

- Consider how your engagement will be appreciated by different ages. A really good talk or presentation can engage children and adults at the same time. Can you develop content that you would genuinely like to see yourself, as well as being family-friendly? If you've watched QI you'll know adults are as impressed by strange facts and curious science as children!
- If you are designing a workshop, you might want to consider creating a role for the adult where they take on the part of an educator or facilitator. This is great for families with younger children. It will help if you give the adults a clear task and explain any goals. This is also a great way to teach the adult **science by stealth**. For example, the children could complete an experiment, but the adult has to write down and record results.

- You might also consider playing with traditional family dynamics. Can you make a task for the family to do as peers? This can be a great way to inspire confidence in children as they get to be equal to their adults. This could be a game where they all have to work together to complete a challenge, or you might get the adults to play against the children (but try and make a task where you think children would do equally well).
- Can you build in questions for adults too? In face-to-face engagement, it's great to speak to the parents. If you ask the children a question, throw it out to the adults too! It's good to model scientific conversations with adults in front of children. By bringing in the adults you can increase the chance of families continuing the discussion back at home.
- Can you encourage families to have their own scientific debates or ask each other questions? You might pose a question and get families in their groups to discuss it before asking the wider group for thoughts. Think about how you can create an activity that groups might carry on at home, this could be a physical activity like making or doing, something for them to research together, or maybe a really interesting debate they want to carry on afterwards.



4 | Theoretical underpinning: A constructivist approach

An approach you might find useful is the theory of **constructivism**. Constructivism is based on taking an approach that puts the learners first and allows them to make or construct their own learning, building on what they know already.

One of the key ways you can help is with **scaffolding**. Think of your scaffolding as a **support that helps the learner achieve more than they would be able to do on their own**, but refrains from just telling them the answer or exactly what to do. One of the great ways you can do that is by asking questions.

Although it's easy to think of engagement as telling and showing, often the most important thing we can do is **ask questions** that get participants to critically consider their own knowledge and understanding. This can help audiences make links in their own knowledge and is much more powerful than being told the answer.

Say you are doing a simple experiment that involves a reactive metal in acid producing hydrogen. A family might ask “*what is going on?*” Perhaps instead of telling them, you might ask them some questions:

Well what can you see?

Ok, that's great - small things rising up. What do they look like?

Yes, exactly bubbles. Can anyone tell me what's in fizzy drinks that makes bubbles?

Yes, (thanks adult) it's gas, has anyone heard of that word?

What can you tell me about gas?

Now if we look at this gas, is it going up or down?

Ok I think you are right, it is going up. Now do you know any gasses that float up?

Yes you're right, it is hydrogen.

Now, we put some metal in, where do you think it's gone?

OK you think it's disappeared. Can you tell me what you mean by disappeared?

Does everyone agree?

Ok, so perhaps not disappeared, but it's not visible anymore so you are right, something has happened...

You haven't told them the answer, but with your scaffolding and support they have come up with the correct answer using their prior knowledge. It would have been faster to say metal dissolved and hydrogen was released, but they would have learned far less and not realised they knew quite a lot already. Neither would they have got the right answer without your help – **you have scaffolded their learning through questions.**

It is important that when you are doing this you are really supportive in your tone and language, as often asking questions can make people think they've made a mistake. Questioning has a bad rep (taken in for questioning, if your manager questions your work, being asked questions in a test etc.) but it is a **great tool**.

Can you build in questions for adults? It helps if you can bring the adult's prior knowledge into the group too, as their prior knowledge and skills might allow the family to do something that the children wouldn't be able to do by themselves.

It's important to note here that constructivism also works really well within the social dynamic of family groups. Younger children learn from observing adults and older children, so even if younger children might not be able to do task by themselves, they can observe and ask questions to the other members of their group, or you can ask the adults to give the children support and advice.



and so on.

5 | Practicalities

Working with families also has some practical challenges. Here are some things to consider as you plan your engagement activity:

Risk assessment

If you are planning an activity, you'll **need** to do a risk assessment, to ensure that risks are considered and mitigated against. It's important to remember that children do not consider risk like adults so you will need to consider how any materials or equipment you use could be harmful if used incorrectly. For example, you might need to make sure that children don't work on the floor where they can trip up adults. *You might think drinking the mystery liquid with a warning sign is a bad idea*, but a two-year-old will have other ideas. Consider the design of your engagement so risks are minimised or eliminated, a warning sign is not enough.

Stretch activities

Have you considered older and younger children? Often families come with multiple children, only some of which will be the ideal age for your activity. Think about **stretch activities** for older children or something for younger children. Often young children will just want to copy what their siblings are doing, so is there a simpler version they can do? If you are making towers as an engineering challenge perhaps the two-year-old can stack blocks? If you are giving older children microscopes, could you buy magnifying glasses that are safe for toddlers?

Housekeeping

Before you start, do you know where the toilet is, where the baby change is and where to park a buggy? If you've got a popular activity you might be asked these a lot so it's good to be prepared.

Resources

Have you got enough materials for the numbers you are expecting? It's always good to have spare in case your activity is more popular than you thought, and it means you'll not have to spend too much time keeping an eye on stock levels and can be generous.

It's a good idea to make it really clear if the activity is one where participants can take away resources or not, and it is clear which resources those are. You don't want all your pencils running out because people assume they can all take one, but at the same time you don't want families leaving their great work or a freebie as they didn't know they could have them.

Language

Try to avoid the term "parents". Children may come with other family members, friends or be in social services or in care. Likewise avoid the term "mums" (particularly in a mixed gender room) as often dads will be the minority so it's important that we use inclusive language. We tend to find "adults" is clear enough without making assumptions.

Numbers

Think about how you might manage people if your activity proves popular. Queuing or ticketing or timed slots can work well. If you do need to manage numbers, it is important to set expectations. What's the average wait? How long does the activity take? Is there a time that people can come back? Have a plan for if it gets busy as it's quite hard to make a plan in the middle of running a session.



Case study: Super structures

What is it?

Super Structures was a socially distanced face-to-face event that took place in October 2020 at the Invention Rooms in White City. Families were invited to create structures using straws and tape with an Imperial engineer who talked about their research on the principles of bracing and trusses in creating stable structures.

Why is it a good example?

Parents sat with their children and actively engaged with learning, taking apart and building structures together. The activity was simple without being childish and encouraged play, so adults had more fun than they expected.

The activity was open-ended, and learner led. Families weren't told how to build their structures – they were given a framework and some key concepts then were free to experiment with designs. Learning was scaffolded with members of staff asking questions like “What if you try this?” without saying what is right or wrong.

All the equipment was recyclable and there was lot to spare so families could take some home along with an activity sheet enabling them to continue conversations and experiments at home.



Further reading – Let us know of others!

- To learn more about learning outcomes, we cover them in our resource “How do I engage through games and play?”
- We mentioned roles of adults and children. If you are interested in setting up roles for families we recommend reading up on cooperative learning:
<http://www.co-operation.org/what-is-cooperative-learning>
- If you want to find out more about constructive informal learning, this guide is comprehensive without being too technical:
http://www.ucdoer.ie/index.php/Education_Theory/Constructivism_and_Social_Constructivism
- Although we have touched on *prior knowledge* that you can build on it's important to note that families will also come with different attitudes, skills, and experiences around science. A good way to explore this is the theory of science capital. This guide [here](#) is a good starting point.