





Welcoming autistic people

A guide for the Royal Astronomical Society and partners



The RAS200 projects brought the wonders of Space and Earth to brand new audiences across the UK. Prisoners and their families took part in inspiring astronomy workshops and space-themed activities, while more than 30,000 Brownies explored the constellations for their 'Space Interest' badge, developed in collaboration with RAS Fellows. Night skies residentials gave full-time carers a change and a rest, and young people not in education, employment or training discovered stargazing at wilderness camps. RAS200 has also been working with the National Autistic Society on how we can make our community education work more autism friendly - furthering the aim and legacy of RAS200 to reach all groups in society.

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Introduction

The Royal Astronomical Society celebrated its bicentennial in 2020 with a £1m fund to support the 'RAS200 Sky and Earth' projects. RAS200 wanted to go where no outreach programme has gone before, involving people of all ages, abilities and backgrounds in astronomy and geophysics.

Twelve innovative RAS200 projects from a wide range of partners brought the wonders of Space and Earth to new audiences - from prisoners to Brownie Guides, full-time carers to young people not in education, employment or training - inspiring them to look up to the skies and broadening their interest in science, technology, engineering and maths (STEM).

RAS200 is also working with the National Autistic Society in support of our aim to reach those who might otherwise be excluded from STEM learning and outreach opportunities. Many autistic people are passionate about science and astronomy, but experience significant barriers to participation. We want to change that by being aware of those barriers and working to minimise them.

The aim of this guide

This guide provides information about what autism is and the many ways it can affect people's experiences of dayto-day life. It suggests how we and our partners can take account of this in our community education, and where possible adapt venues and events to ensure they are autism friendly. It aims to enable staff, volunteers and event organisers to feel confident communicating with autistic people so that everyone is able to get involved and contribute as fully as possible. We recognise that our RAS200 partners' and Fellows' work is extremely wideranging – meaning not every part of the guide will be relevant to everyone – and that resource constraints play a part in the extent to which venues and activities can be adapted.

However, the thing autistic people and their families often tell us will make the biggest improvement to their experience is greater public awareness and understanding of autism. We hope this guide will contribute to raising that awareness - furthering the RAS200 legacy to reach out to all groups in society, and ensuring that the fields of astronomy, geophysics and STEM benefit from having everyone on board.



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An astronaut spirals into Jupiter's Red Spot – part of 'The Planets 360' full-dome immersive planetarium show devised by the creative team at the National Space Centre as part of RAS200. The show is freely available to all UK planetariums and can be tailored to different audiences.

Photo: NSC Creative



About autism

Autism is a lifelong disability that affects how people see the world and interact with others. It is a spectrum condition, which means while all autistic people share certain difficulties, being autistic will affect them in different ways. Often people feel that being autistic is a fundamental aspect of their identity.

Autism is much more common than most people think. There are around 700,000 people in the UK on the autism spectrum - that's more than one in 100. Together with their families, this means autism is a part of daily life for 2.8 million people. People from all nationalities and cultural, religious and social backgrounds can be autistic. Both men and women can be autistic, although more men are diagnosed.

Autistic people see, hear and feel the world differently to other people. They can become overwhelmed by everything around them, which can make the world a terrifying and isolating place. Some autistic people also have learning disabilities, mental health issues or other conditions, meaning people need different levels of support. With the right sort of support, all people on the autism spectrum can be helped to live a more fulfilling life of their own choosing.

Although almost everyone has heard of autism, only 16% of autistic people and their families think the public understand autism in a meaningful way. This lack of understanding has a daily impact on autistic people's lives and is one of the major barriers they face to engaging in education, employment and leisure activities.

The nature of some environments - noisy, busy and filled with overwhelming sensory information - can also cause difficulties.

Understanding autism and making appropriate adjustments can make a big difference to the experiences of autistic people and their families or carers.

For more information, see www.autism.org.uk

Characteristics of autism

Autistic people can:

- find it difficult to understand and use language to communicate, and may interpret phrases literally
- find it difficult to understand and use tone of voice, facial expressions, body language and the unspoken rules of language, like the give-andtake nature of conversations
- have difficulty recognising people's feelings or expressing their own
- struggle to make and keep friends and maintain other social relationships
- find it difficult to understand and predict people's behaviour
- have a strong need to stick to the familiar and find change and unexpected situations stressful
- have sensory sensitivities, for example over-sensitivity to loud noises, certain lights and strong smells
- have intense special interests.

Society ambassador





Autism, special interests and STEM

Autistic people can become experts in their special interests and often like to share their knowledge. They gain huge amounts of pleasure from pursuing their passions and see this as fundamental to their wellbeing and happiness.

Many autistic people gravitate towards sciences and maths with their emphasis on logic, patterns and rule-based systems. Some have highly successful careers in science, engineering and IT. It is thought that many famous scientists and astronomers in history were on the autism spectrum.

However, for far too many autistic people, the picture is one of exclusion and wasted talent. Despite many autistic people having a natural affinity for science and tech, they are often excluded from STEM activities due to mistaken assumptions about their learning capacity or judgemental attitudes towards their behaviour and communication. Some autistic students drop out of mainstream school because it is not autism friendly, or are not encouraged to pursue post-secondary education.

By increasing understanding in education and employment settings, scientific organisations and society as a whole, we can increase the number of autistic people working in the field of STEM. The sector will benefit from having a truly neurodiverse workforce and harnessing the many strengths of people on the autism spectrum. These can include (but are not limited to):

- memorising and learning information quickly
- logical thinking
- being precise and detail-orientated
- exceptional honesty and reliability
- ability to concentrate for long periods of time when motivated
- a drive for perfection and order
- problem-solving skills.



Camilla Pang, scientist and author of Explaining Humans, a memoir about being on the autism spectrum



Every autistic person is different, much as every environment is different."

I was diagnosed as autistic at eight vears old. I really didn't understand what it meant. I felt the diagnosis was something to explain my behaviour to my teachers and parents, so I carried on being myself as I didn't notice I was behaving differently to my peers. But I hated going on the bus, needed to stick to a strict routine, and found it hard integrating with others, not because I was antisocial, but because I felt I was on a different wavelength.

I had very bad anxiety, to the point where even words could trigger it, and I used to have a need to make squeaking noises, which can be a form of stimming (repetitive behaviours that can help some autistic people manage anxiety and sensory overload). Whether these behaviours are good or bad is purely based on the tolerances of the environment - every autistic person is different, much as every environment is different.

Girls are very good at 'masking', a term used by autistic people, their families



Sometimes, I lose track of what I need to do when, and why, and from my experience go into 'survival mode', where everything feels overwhelming and it's hard to think of how things fit into different contexts. I think lots of people find the way they process sensory input changes day to day, which can be good because it makes you more creative, but can also feel chaotic. It's all about finding solutions and being brave enough to acknowledge their value.



How you can help autistic people pre-visit

For autistic people, the world can be confusing and difficult to navigate. Many feel anxious about visiting new places or doing something for the first time. By providing as much advance information as possible about your venue or astronomy activities, you can help autistic people to plan ahead, reduce anxiety and get the most out of the experience.

Advance information can cover things like:

- areas where queuing is required
- entrances and exits, including any security checks
- lifts, escalators, revolving doors and narrow staircases
- fluorescent or bright lighting including as part of live shows
- noisy and busy areas, including areas under construction or refurbishment
- areas with strong smells, for example where experiments take place
- quieter times to visit
- parking
- where the toilets are.

You can include all this info on your website, ideally illustrated with maps, photographs, video clips or even a virtual tour. If your event or community education project is taking place over a number of days, a clear timetable showing the structure of each day would be very helpful to enable autistic participants to plan and anticipate.

Visual stories

Consider providing a visual story, particularly if your project or activity is aimed at young people. Visual stories are short descriptions of a particular situation, event or activity, which include specific information about what to expect in that situation.

They can be in the form of a visual trail, with photographs and straightforward text highlighting particular areas that may be challenging or confusing for an autistic visitor.

Accessibility guides

An accessibility guide provides potential visitors with important information about a venue, property or service. It enables individuals with accessibility requirements or other additional needs to make informed decisions about when and where to visit in view of their requirements.

Visit England and VisitScotland provide a free website for easy production of accessibility guides. It asks a series of questions on your venue's accessibility and prompts you to upload useful photos and additional information. It then provides a unique web link to promote your accessibility guide, which you can add to your website and share across social media channels. To create your guide, go to: www.accessibilityguides.org

My experience

James Ward-Sinclair, autistic advocate and founder of the blog Autistic & Unapologetic



Being well aware of what you are going to see, hear and even smell when out can give your brain the head start it needs to avoid any excess information overload."

Being autistic means a lot of second guessing and a lot of extra planning. I tend to overthink experiences that have happened. This means that when everyone has moved on and is living in the present, I am still hooked on a slip-up from an earlier event, which can range from a discussion that made me uncomfortable to a venue that was simply too loud. This obsession with an error from my past means that I don't pay attention to the here and now, causing me to make yet another action which I consider an error, and so the whole cycle continues.

In the past this catch 22 has made me reluctant to go out (as even with all the planning in the world, something always goes wrong) but recently I have challenged myself to not let these anxieties beat me - something which

I am so far achieving with the help of lots of self-imposed recovery time after any/every public outing.

When an autistic person enters an unknown environment, it can make a huge difference for their brain to be prepared to work overtime to ensure that an overload doesn't turn into a meltdown. Being well aware of what you are going to see, hear and even smell when out can give your brain the head start it needs to avoid any excess information overload. For this reason, myself and many others on the autism spectrum can benefit greatly from a test lap on any upcoming event something which, thanks to the miracle that is Google Maps, is easier than ever before (especially with the new feature that even lets you enter buildings!).



Making your venue autism friendly

For autistic people with sensory sensitivity, busy planetariums or crowded classrooms can be challenging. This section looks at how you can adapt your astronomy event or experience to help make it more autism friendly.

Processing everyday sensory information can be difficult for autistic people. They may experience over- or undersensitivity to sounds, touch, tastes, smells, light, colours, temperatures or pain. For example, they may find certain background sounds like music, which other people ignore or block out, unbearably loud or distracting. This can cause anxiety or even physical pain. Many autistic people avoid everyday situations because of their sensitivity issues. However, there are many simple adjustments that can make environments more autism friendly.

Maps can identify areas of sensory activity, allowing autistic visitors or their parents/carers to choose whether to avoid a particular area that they might find challenging. Consider offering quieter sessions just for visitors on the autism spectrum (see example from the Royal Observatory in Greenwich, overleaf). Here you can adjust the light, turn the volume down or off, reduce strong smells and allow for a more relaxed environment, where autistic people know they will meet with understanding and acceptance.

Understanding meltdowns

Despite best efforts, sensory overload may still occur, perhaps as the result of an unexpected event, resulting in a response known as a 'meltdown'. The National Autistic Society describes this as "an intense response to overwhelming situations". This loss of control can be very upsetting for the autistic person and anyone witnessing it. If possible, larger venues should offer a safe, quiet space to have a meltdown or to de-escalate afterwards. This should be a low-arousal environment, with adjustable lighting and comfortable seating, ideally well away from the main bustle of your venue or event.

Things to consider

Bright lights

- Can you reduce the brightness of the lights within your buildings? Or can you allocate an area where lights are dimmed and it is quieter than the rest of the building(s)?
- If you can hold a relaxed performance, ensure there is enough lighting to allow autistic visitors to move around freely or leave a live show if it becomes overwhelming.

Noise

- Do you play background music?
 Can you turn it off or reduce the volume?
- Can you reduce other noise? If not, provide information about what could happen and when.
- Can you provide alternatives to noisy hand dryers in toilet areas?
- Some autistic people choose to wear ear defenders in noisy environments. Could you have some available for loan if needed?

Crowds and queues

- Are there areas of your buildings which can get particularly crowded? Can you minimise this? If not, you could let autistic visitors know which times are quieter.
- Is there a way you can enable autistic visitors to avoid queues?

Maps and quiet trails

- A map could help autistic visitors to navigate their way around. Highlight areas that could be busy or noisier, or could have sudden changes in light levels.
- If possible, offer 'quiet trails' through your venue, avoiding potential triggers.

Quiet space

- Is there a quiet space that is away from the main crowds and has low-level lighting (or lighting that can be dimmed) where an autistic person could retreat to if an environment becomes too much?
- Equip this area with bean-bags and other sensory equipment/toys, such as fidget spinners and stress balls.

'Autism hour' or relaxed performances

- You could have a special autism hour, where you dim your lighting and turn down the volume. This could be a monthly event, or opening an hour later or earlier than usual.
- Planetariums with live entertainment could offer autism-friendly performances or screenings, with a relaxed attitude to people moving around and quiet areas away from the main event (see over).

Language

 Use clear language in all your written and spoken communication.
 Puns and wordplay can be confusing and unhelpful to people on the autism spectrum. If your performance includes narration, could you slow it down or simplify it?

Invest in staff training

 Training helps staff and volunteers feel confident communicating with autistic people and knowing how to react if someone needs help. This makes all the difference to autistic visitors and their families.

Ask for feedback

• Gain feedback from autistic people and their families to find out what works and what adjustments you could make.





Autism-friendly events and experiences

Lots of people and children especially love an immersive, noisy, hands-on experience when visiting museums and taking part in workshops or events. Scientific experiments are often at their most memorable and exciting when they generate bangs, fizzes, smoke and interesting smells. Music, motion and special effects can create a thrilling astronomical display. But for some autistic visitors, of any age, these aspects can be off-putting or even overwhelming.

Sensory considerations for events and workshops

Autistic people may be over-sensitive to specific sights, sounds, smells or textures, while others will be under-sensitive to the same stimuli and crave more sensory input. Think in terms of the senses:

Sight - Visual patterns, certain colours and shapes, moving or spinning objects and bright objects and colours can be appealing or overwhelming, depending on sensory sensitivity.

Smell - Some autistic people are extremely sensitive to smell and are able to detect smells that others don't even notice.

Hearing - Loud/unexpected sounds, such as big bangs, music or the reactions of an enthusiastic audience, can be triggering.

Touch - Autistic people can be especially sensitive to touch and texture. Those who are sensory seeking will appreciate the opportunity to handle objects and compare different weights and textures. Fidget toys and stress balls can be soothing. As always, the key thing is to be aware of the potential impact of your activities and be willing to adapt where necessary.

Providing advance information is important, even if this is just a short talk at the start to make your audience aware of what's involved.

This means people can choose to sit out a particular activity or to make their own simple adjustments, such as closing their eyes or putting their hands over their ears when necessary.

For more information on sensory over- and under-sensitivity, see the National Autistic Society website: **www.autism.org.uk**

Ask the experts

As experts in how the condition affects them, people on the autism spectrum will give



you valuable insight and specific feedback about your venue or event and the kinds of adjustments you can make to ease sensory stress. You could contact the autistic visitor audience through the National Autistic Society, a local special school or parent carers' organisation.

Increasing access through online activities

Providing an online or blended offer can ensure that more people – including those on the autism spectrum – can take part in education and outreach activities. For many autistic people, online learning and activities remove many of the stresses associated with travelling to a venue and mixing with other participants. It puts them in control of their own environment and means they can go at their preferred pace. For some autistic people, social anxiety means online participation is their only option, while for others it's a stepping stone to being able to get involved in person.

Relaxed performances: example

'Morning Stars' planetarium shows at the Royal Observatory in Greenwich are designed for anyone who would benefit from a calmer and more relaxed environment, in particular those on the autism spectrum. The shows are presented live by a Royal Observatory astronomer, with several adaptations from the normal planetarium sessions.

- Room lighting is left at a higher level so visitors can walk around safely and leave/return to the show more easily.
- The narration is much slower and calmer.
- The presenter describes everything before it happens, giving plenty of time for autistic visitors to prepare for any changes in light levels, imagery or sounds.

- A small number of ear defenders are available to borrow for the duration of the show and visitors are encouraged to bring their own if they prefer.
- Fewer tickets are available so there is more space to spread out from other visitors.
- The show runs at the beginning of the day, so there are fewer visitors around the site in general.

There are different variations of the show, tailored to suit those with different levels of astronomy knowledge. Morning Stars shows usually take place during the school holidays. For more information, see: www.rmg.co.uk/whats-on/ royal-observatory/morning-stars



My experience

Sriman (11), autistic astronomy fan



The things I find difficult are crowds and music. What would make it better is a quiet area with planet toys, like stress balls."



I first got interested in astronomy in about 2013. In school I like science because of learning about the solar system. We did this in primary school but in secondary school we don't. I have been to the planetarium in Greenwich. It was cool, it had lots of planet souvenirs of the solar system. I saw the evolution of the sun's birth and death.

Here's a fun astronomy fact. Most likely the moon smells like burnt gunpowder, Venus smells like feet, and Uranus stinks. Its atmosphere is made of hydrogen sulphide and it's one of the smelliest elements in the universe. It smells like rotten eggs.

The things I find difficult are crowds and music. What would make it better is a quiet area with planet toys, like stress balls. Quiet areas, work spaces, sensory rooms and soft play areas make autistic people feel better. I have ten planet stress balls, a scale solar system and one bonus planet. I also have a stars projector that I sometimes put on at night. When I go somewhere new I get prepared for the loud noises - I bring ear defenders and the sunflower lanyard. You put it on to show that you have special needs. When I'm older I would like to make films about how stars are born, how stars die, how the universe forms, what are galaxies and how are they formed, including the solar system and other planets.

The Hidden Disabilities Sunflower enables people with non-visible disabilities to access the support they need. It acts as a prompt for someone to choose to let people around them know they have a non-visible disability and that they may need a helping hand, understanding, or simply more time.

HIDDEN

l am autistic

hiddendisabilitiesstore.com

Rangamani, Sriman's mum



It would be really helpful if venues could have an autism-friendly zone where autistic children can take some time out."

When we visit an attraction, I always go in first and tell the staff about Sriman's needs. Usually we're given fast track or VIP access, which means you don't have to queue for a long time. This makes a big difference. I take ear defenders, the sunflower lanyard, his planet stress balls, his favourite books and whatever fidgety things I have. It's all in a pack that I take wherever we go. At times it doesn't help at all - that's the worst thing. I still face challenges in spite of the preparations.

The lack of understanding can be very difficult. When Sriman has a meltdown he doesn't like me talking to him or touching him - I just have to give him space and watch from a distance, and he'll eventually calm down. But most people don't understand this and sometimes you get nasty looks. When we visited Tower Bridge, Sriman had a really big meltdown, and only one woman came and asked me, "Do you need help, are you ok?" That was the only thing I needed just then.



At times like this Sriman needs a space where he doesn't have to deal with noise or smells or light, and in 15 or 20 minutes he'll be fine and can carry on. But if there isn't a space like this, you just have to leave. So it would be really helpful if venues could have an autism-friendly zone - a small soft play or sensory area, like a cubicle or pod or even a blackout tent. It doesn't have to be expensive stuff. The smallest things can be very helpful. That way, autistic children can take some time out and then carry on and enjoy what everyone else is enjoying. Autism-friendly hours are really helpful too, because you know other people will understand and will try to accommodate you.

I don't know where Sriman got the interest in astronomy from! He can keep talking and talking about space - he never gets tired of it. I just want to encourage him, as I would honestly expect him to lean towards astronomy when he is older, but of course he'll need to do well in maths and other subjects. If there is a place he can shine, I'll be the first person to send him there.



Top tips for interacting with autistic people

The National Autistic Society surveyed over 7,000 autistic people and their families to find out what they wanted the public to understand about autism and how they wanted them to change their behaviour to be more autism friendly. This is what they said:

1. Be patient and give the person space during a meltdown

A meltdown is when an autistic person gets overwhelmed by everything around them, and may begin to shout, scream, cry or lose control. Spare a moment. First things first, try not to judge. Be patient, calmly ask if they're OK and give them some time and space to recover. That really is all it takes to help.

2. Notify people of changes to plans

The world can be an unpredictable, confusing place for autistic people, and that can make having a set routine crucial for getting by. So when something unexpected happens, it can feel like the whole world is spinning out of control. Give some warning. The best way for an autistic person to deal with unexpected changes is to, well, expect them! So if plans do change, let them know in advance. A little notice and understanding can go a long way.

3. Help to alleviate social anxiety

Trying to understand what others mean and how to behave can be exhausting and stressful for autistic people, causing many to end up feeling excluded and isolated. Take an interest. Invite them to join activities as much as they feel they want to. Listen to their concerns, and if they're struggling, just offer some support. Patience, understanding and positive communication can go a long way.

4. Give people plenty of processing time

Sometimes autistic people feel like they're getting 'too much information' and need a few moments to filter through it all. This is called processing time. Give a minute. Ask one question as simply as you can, and just wait. If you still don't get a response, try rephrasing it or writing it down instead.

5. Take steps to reduce sensory overload

Autistic people can be sensitive to lights, sounds, smells and sights. This can lead to an overload - and a meltdown. Make some space. Lots of little things can add up to an overload of sensory information. Which means little things from you can cut this down. Try to avoid talking over each other, turn down your music, or even just offer to dim glaring lights.

Acknowledgements

This guide was produced by the National Autistic Society in 2022 in partnership with RAS200. We are very grateful to the Royal Astronomical Society for supporting and funding this effort to increase autism awareness. We would also like to thank everyone who shared their experiences of autism and allowed us to use their testimonies and photographs.

Find out more

Thank you for taking the time to read this guide. We hope it has improved your understanding of autism and of what you can do to welcome and involve autistic people in your outreach activities. To find out more, please contact the National Autistic Society or visit autism.org.uk



Photos: pp. 2-3 (clockwise from bottom) carers at a night skies residential on the Isle of Coll; spacethemed street party at HMP Brixton; a Brownie studies for the Space Interest badge; young people visit the Royal Observatory in Greenwich; p. 19 (left) astronaut Tim Peake addresses a Prince's Trust event in Cardiff; p. 19 (right) human gyroscope gives a taste of zero gravity at HMP Brixton. Photo credits: p. 2 (top) RAS200 and Lynda Laird; pp. 5, 13 and 15 NSC Creative; p. 16 (bottom) Hidden Disabilities; p. 19 (left) Prince's Trust; p. 19 (right) RAS200 and Lynda Laird; all other photos National Autistic Society.



This guide was produced by the National Autistic Society and commissioned by the Royal Astronomical Society as part of its RAS200 programme and legacy. It supports the aim of the RAS200 to reach new and diverse audiences, particularly those who might otherwise be excluded from STEM learning and outreach opportunities.

The National Autistic Society is here to transform lives, change attitudes and create a society that works for autistic people.

We transform lives by providing support, information and practical advice for the 700,000 autistic adults and children in the UK, as well as their three million family members and carers. Since 1962, autistic people have turned to us at key moments or challenging times in their lives, be it getting a diagnosis, going to school or finding work.

We change attitudes by improving public understanding of autism and the difficulties many autistic people face. We also work closely with businesses, local authorities and government to help them provide more autism-friendly spaces, deliver better services and improve laws.

We have come a long way, but there is still so much to do to increase opportunities, reduce social isolation and build a brighter future for people on the spectrum. With your help, we can make it happen.

Find out more at www.autism.org.uk



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