IDEAS
START
HERE

#MakeYourIdeas

Table of Contents

Hey there! Thanks for being so Pioneering!

If you're reading this it means you're a coding crusader, a troubadour of tech, a creative coach, a mentor of makers. You've decided to help coach a team of young people through the creation, design and prototyping of an invention for Pioneers! So, first and foremost: thank you and congratulations! You've just joined a select group of people we like to call Mentors.

Your job over the course of the Pioneers Project is to coach and support your team through the challenges they will face, but don't worry! Everything you'll need to know (and a few things to think about) is all contained within the pages of this guide. If you happen to come up against a problem you just can't seem to overcome, feel free to email us at pioneers@raspberrypi.org or give us a holler on our Slack channel. If you don't use Slack yet, don't worry: we'll show you how to get hooked up and linked in to the discussion.

Oh, one more thing - and this one is important: always be recording what happens on your project through photos and video! You'll need to submit a video as your entry, and the way to ensure a good explanatory video is to have lots of footage to choose from. Make sure your whole team is involved in recording your project, and you'll be on your way to a great submission.

First things first, though: have you registered for the competition? You'll need to give us your email address so we can contact you, and the names and ages of your team members, for starters. If you haven't done that yet, do it now.

How will you participate in Pioneers?

First up, you need to decide how you'll proceed when it comes to your participation in Pioneers. In our experience there are three main ways to run a Pioneers team:

1. You can organise a Group which meets once or twice a week to discuss how it's going, get some mentor advice to overcome any encountered issues, and maybe learn a new skill they need to progress, but your members may also work independently and in their free time at home. We find this method works well for school-based teams that can meet at the end of a school day for an hour or two a week. Pioneers don't have to work at home, but it's hard to get a lot of traction in an hour per week, so we recommend that you encourage them to carry on without you between meetups. While you'll provide enough structure and hands-on help in the meetups to enable teams to complete an entry, the best entries are ones that are also worked on by participants between the weekly sessions.

2. You could mentor a Squad that is largely informal and probably already has a good idea of what they're doing. A Squad tends to be more independent and compartmentalised. If you have a group of savvy kids, putting them in a group chat online, showing them Stack Overflow and turning them loose to create something freestyle can be an awesome experience. The young people also benefit from working as part of a team and taking responsibility for their own workload. Your job as a Squad Mentor is more along the lines of being the 'Help Desk' when they get stuck, or need some innovation midwifery. Meetings may be sporadic, informal or online only. Slack is your friend in this incarnation of a Pioneers team, and will provide you with opportunities to support your team from afar without much interference. Your team will bounce ideas off you from time to time and ask for your opinion, but will largely make progress themselves toward a final result. This option isn't recommended if it's your first competition, or if you're not a techie yourself.

3. You could join a local Event that is meeting at a technology hub near you. We're hoping to run more and more of these events around the country as Pioneers evolves and grows. We feel that this is a great way to get a lot of people together from a local community, to meet other interesting makers and tinkerers nearby. You'll have a good time over a couple of days in a workshop or meeting place with like-minded folks, learn some useful skills and gain access to equipment and expertise you may not be able to find easily anywhere else. Ideally, the venue will provide experienced makers to help you to access the equipment in the space, and lend some workshop wisdom to your make. Check the Pioneers site for more information on events near you. If you think you'd like to help us run an event, get in touch! We love to hear from people who want to spread their love of making, and we'll support you as much as we possibly can to get your event rocking along. If you want to run an Event, you will need to preregister on the Pioneers website so that we can get you all the support you need well before you open your doors.

Getting the hookup

Now that you're signed up, let's get you jacked in. Feel free to email us at Pioneers, but for a rapid and crowdsourced response we like to use Slack to chat with all our Mentors in a group online. It's a simple messaging app that's super useful and really common in the tech industry for helping teams to collaborate. It might even be worth getting your team members signed up on Slack in your own channel. It'll allow you to communicate and share ideas, pictures, videos and all sorts of things easily and quickly. Not only that, but you'll be imparting useful communication skills to your team members that will set them in good stead for their future endeavours in making and technology.

Once you've registered, you should receive an invitation to Slack from The Raspberry Pi Foundation. Once you've been invited to join a Slack team, the first step is setting up your account. Just click the link in your email invitation to get started.

1. Check your inbox for an invitation to join a Slack team.
2. Click the Join button.
3. On the signup page, enter your first and last name and choose a username.
4. When you're ready, click Next.
5. Choose a password, then click 'Join team'.

That's all it takes - you're done! You can join as many Slack teams as you want, and you can even use the same email address each time.

We'll be sending you a weekly email during the challenge cycle to keep you up to date with the latest Pioneers happenings. We will also hold monthly video chats to answer your questions and support you through the whole process.

Getting the band together

Once you've decided how you'd like to mentor your team towards victory, the next step is getting them all together to start discussing your make. This allows your team to develop a relationship as a unit, as well as helping you all to understand each other's respective skills, expertise, personalities and interests. Unless your team has already worked together on a project or competition, it's unlikely that they will have developed the esprit de corps and camaraderie required for a winning entry.

Before you meet for the first time, you'll want to have an idea of the tech you have available. Make a list of the kit available for your Pioneers to use, at home and at your venue.

At your first meeting, why not show your team our video *How to be a Pioneer*, to give them an overview of the stages that you will be going through over the course of your Pioneers participation? You don't have to have a working idea at the end of your first session, but it helps to have done some research and at least brainstormed a few things on which the team can ruminate before you come back together again. The most important thing is for your team members to get to know each other, to get comfortable working side by side, and have a good understanding of where they fit into the dynamic of the team as a whole.

Some kids are mad-keen coders, some are excellent with their hands, some are brilliant artists. Find out what your team is good at and what they like to do. While we want the kids to learn new skills and have a go at something novel, it's always nice to know what your strengths are and how to best deploy your available assets in the event of a crisis.

The video, and this poster, provide a basic overview of what a Pioneers Project looks like. They show you the main stages of creating something awesome for Pioneers, and will help your team to understand that making is a multi-stage process. The iPhone wasn't built in a day! Both are an excellent way to start a conversation about what you're going to make.

One of our Pioneers team summed it all up as:

- Theme announced
- Go crazy with ideas
- Design and develop something epic
- Reflect on making/what did we learn?
- Make cool video
- Submit cool video
- Celebrate our awesomeness!

If this is your first time working on a digital making project, it can be a good idea to try your hand at a simple starter project. We have selected a few, relevant to the theme, and linked to written instructions and video tutorials. Have a look on our website for details of these projects, or find them in the mentor plan below. Remember though: try to encourage your group to think beyond this project for their final build, as competition will be higher in projects that stick closely to these ideas.

Present the theme of this cycle of Pioneers to your team and begin to talk about the first stage of the process: discovery. Let your kids research the topic, and come back with some workable examples of things that fit the theme. From here you can narrow it down to just a

few ideas that seem exciting, but manageable (nobody is building a dimensional teleporter, for example. Keep it real.). You may find that this meeting unearths your project idea right away, or you may want the team to go away and think about it for a bit before you come to a consensus.

Once you've chosen a project (or at least narrowed it down to a few ideas), start making moves towards the build. You'll need to discuss your planned methodology for the build; what the roles will be in your team; where you can go for assistance for things that may be a bit advanced; and what materials you'll need to make it all work.

We send registered mentors details of the discount available on kit for the starter projects, and any additional support we are able to offer during each cycle. Contact pioneers@raspberrypi.org if you've registered, but you can't find that email.

Remember: always be recording! Whether that's photos or footage - the more of it you have, the more options you will give yourself when it comes to making your submission video! Get the kids to take pics and video as you work and share it on your Slack channel. That way it'll all be in the same place when you need it.

Make a thing

Now that you've got an idea of what you'll be doing and how you'll get started, you need to make something! Here are some tips for preparing and running your Pioneers make, depending on the format you're using.

Group

- Try to set goals for each session, and set simple tasks to be completed by each team member before the next session. This might be research, sourcing materials, or fabricating something simple.
- Sometimes you won't know the answer to a question or the solution to a problem. That's totally cool: just encourage the kids to jump on the internet and ask Google. Someone will have the answer, so why reinvent the wheel?
- Make sure that you have at least two scheduled sessions at the end of the project which are dedicated to discussing, planning and creating your entry video and looking at your collected footage and photos. This way you'll all be on the same page when it comes to your entry, and you'll be able to fill any explanatory gaps you may find.
- Unless someone is taking it home to work on it, all equipment and parts of your make should stay either with you, the mentor, or in the venue where you meet. Remind your makers to bring their requisite equipment each week so you don't end up with a 'dead' session!

Event

- Make sure that you have registered on the Pioneers website at least four weeks before the event, so that we can send you the swag for your teams.
- You may find that the videos will be completed after the event. Follow up with all the teams to make sure they finish and submit them.

Squad

- Communicate with your team at regular intervals. Because you're meeting less regularly, life can get in the way of your projects - especially so with teens! A little reminder now and then will keep your momentum up.
- Some meetings IRL (In Real Life) are necessary to complete your build. Make sure that this time is used most effectively by encouraging your team to bring pre-written questions or problems to the session so that none of them get left out. Create a structure for the sessions quickly, and work systematically to troubleshoot issues.
- Encourage your Pioneers to take as many pictures, selfies and video as they can during their work, and to share them with you and with each other. You'll need as much collected footage as you can get when it comes to making a video. Towards the end you may find yourselves pressed for time and unable to easily fill gaps in your recording. Taking pictures and video will also inspire conversation, collaboration, and consequently more work for your team.
- An unfinished project can still be a winning entry! If you don't think you're going to be able to finish, document your process anyway, and explain why you didn't succeed. Remember: failure isn't in the falling down, it's in the staying down.

Post-make priorities

Once you've completed your project, you're not quite done! You still need to create a video and submit your entry. Hopefully you've collected enough footage and photos to make something comprehensive. You will need to explain the process your team went through to create their invention, as well as any issues they overcame, and any moments of glory or despair. Your entry is all in the video, so make sure you tell a clear story of your build. Even if you don't succeed at completing what you set out to do, you can still win a prize if your story is told well.

Watch our tips on making a good submission video [here](#)!

Some more tips on making a good video:

- Always try to shoot video and photos in landscape format (sideways/widescreen). This makes for much better viewing for the judges, and allows them to make out the detail in your project.
- Make sure that people speak clearly during filming and explanations. Use a microphone if you can, but otherwise make sure they can be heard by whatever device you are using. If you find that some footage is impossible to hear on editing, subtitles can easily be added in most video editing suites, including Windows Movie Maker.
- If you've never made a video before, don't panic. Two of the simplest and easiest packages you can use are Windows Movie Maker (PC) or iMovie (Mac), both of which are free! They both have a drag and drop interface and allow you to arrange and edit each individual component of your film, including video and photos.
- Ask someone who is not involved in the project to watch your video before you submit. Ask them if there were any parts that were hard to understand, and find out why. Ask if there was anything that could have been explained more clearly. Remember: the judges are smart folks, but they aren't as close to your project as you are.

How do I submit my entry?

You can submit your entry by filling out the form on the Pioneers website.

The best way to get your video to us is by posting it on YouTube, and adding the URL to the requisite field in the submission form.

Submit any code you've used for the build too, either by providing us with your GitHub link, or by attaching it as files on the form. If you can't access GitHub, send us your files in .txt format instead.

We'd also love to see any diagrams, plans, schematics, charts or blueprints you might have lying around. Attach those too, or put links to them in the YouTube description.

Once you've submitted, we'll organise a sack of Pioneers swag to be delivered to you for your team's delectation, and to say well done on a good job jobbed!

So you've submitted. Now what?

Your Pioneers journey is still not over! Now comes the exciting task of waiting for the judging to finish and seeing whether you've won some of our exclusive and rare prizes. Will you get to come with us to Google HQ for Pioneers Camp?

Keep watching the Raspberry Pi social media feeds for further information, and to find out who the winners are. We will also notify you via email as the process goes on, and hope to be in touch with you about the next cycle of Pioneers soon!

If there's any way we can help you during the Project, don't be afraid to email us at pioneers@raspberrypi.org!

Session planning

Phase 1: getting to know you, and getting to know Pioneers

Time: 1 hour

Aim of session: Introduce the Pioneers project and the challenge set for this cycle.

Objectives:
- Get to know everyone in the group and the mentor.
- Introduce the Pioneers challenge theme.
- Collect photos and video for the final submission: 'Look how far we've come!'

Session activities:
- Get to know your team with a quick icebreaker activity.
- Watch the Pioneers videos: *How to be a Pioneer* and *A video about making a video*.
- Reveal the Pioneers challenge theme to your team by showing them the theme video, and start to share ideas. Ask them to write down as many words as they can that spring to mind. After five minutes ask participants to read out their words, and create a word wall for inspiration. You could also create a mood board of images and words to gather the ideas together.

Resources:
- *How to be a Pioneer* video
- *A video about making a video*
- Theme video
- Sticky notes
- Pens

Phase 2: learn the basics

Time: 2-4 hours

Aim of session: Team members will gain basic skills that will give them a sense of the projects they can achieve in the time they have available.

Objectives:
- Select one of the 'Getting started' projects and learn a new skill.
- Share what you made with the rest of the group.
- Reflect on the activity.
- Collect photos and video for the final submission: 'Look how far we've come!'

Session activities:
- Ask participants to select one tutorial to follow to learn their new skill. You can use our list or provide your own. Choose your starter project based on the skill level of your team, your confidence levels, and the kit you have or can get.
- For the 'Make it Outdoors' theme, we have selected:
  - Poo near you: Using the Google Map API (use this project if kit is limited and you need a coding-only project)
  - Getting started with wearables
  - Getting started with picamera
- Share what the team is up to with the hashtag #MakeYourIdeas.

Resources:
- Access to the internet on tablets, smartphones, or computers
- Raspberry Pi Foundation resources, as listed
- Kit (from Pimoroni, or anything you already have)
- Video production devices:
  - smartphone
  - microphone
  - video camera

Phase 3: discover and generate ideas

Time: 1 hour

Aim of session: Research ideas associated with the Pioneers theme, and generate some new ones.

Objectives:
- Understand what this challenge is all about.
- Find inspiration by looking at what other people have done.
- Generate some ideas.
- Select a project.
- Collect photos and video for the final submission: 'Look how far we've come!'

Session activities:
- Use the team's work on building their technical skills to further develop ideas about their project. Make sure to encourage them beyond the project that they tried: we want to see their creativity come out!
- Participants should research projects linked to the theme, either by using suggestions on raspberrypi.org or on a list that you create.
- Feed the findings of the research back to the rest of the group. What was the most exciting project? Why? What ideas has it sparked?
- Ask your team members to pick one or two ideas, and break them down into steps as if they are going to make them. What skills will they need to master? What tech will they need?
- Don't forget to capture some of this process for the final video.

Resources:
- Sticky notes
- Pens
- Access to the internet on tablets, smartphones, or computers
- Video production devices:
    - smartphone
    - microphone
    - video camera

Phase 4: design and build

Time: 4-6 hours

Aim of session: Break the idea down. Assign tasks to team members to complete the build.

Objectives:
- Start planning your idea.
- Decide who will take on which role in your team.
- Work out where you will start and what resources you will need.
- Go shopping and start building!
- Collect photos and video for the final submission: 'Look how far we've come!'

Session activities:
- The team needs to decide on their project. Once they have made a decision, get them to break it down into its component parts, and number these in the order in which they will need to take place. Ask the team to divide the tasks up between them and plan the order in which they will complete them. Designated roles could be useful here (e.g. coder, maker, designer, director, chronicler). The roles could be rotated for each session. One of the extra roles during each session should be recording what happens in photos and videos.
- Finally, ask the team to list all the resources that they think will be needed to complete the project. This could include craft materials like cardboard, glue, and pencils; or digital equipment like a camera, laptop, and access to the internet or bluetooth. It should also include any software like Python, Node-RED or Twitter API. Remember to try and encourage reuse and recycling of materials where possible.
- Now the team can get to work making their project. This may take a number of sessions, and will involve returning to their plan and documenting what they have achieved at the end of each session.

Resources:
- Sticky notes
- Pens
- Access to the internet on tablets, smartphones, or computers
- Relevant kit for their project
- Video production devices:
  - smartphone
  - microphone
  - video camera

Phase 5: test and improve

Time: 1-2 hours

Aim of session: Pioneers will confirm that their project builds work, and improve them based on user feedback.

Objectives:
- Think of methods for testing your prototype and collecting feedback from the intended audience.
- Prioritise feedback in order to implement it.
- Collect photos and video for the final submission: 'Look how far we've come!'

Session activities:
- With the team, discuss the benefits and drawbacks of spending time testing their build and gathering user feedback. Explain that although it is time-consuming, it will help make their projects even better.
- Invite some other individuals (for example parents, school teachers, support assistants, or friends) to a session for testing and feedback. If you have more than one team working on different projects, they could act as testers for each other.
- Once feedback has been collected, ask the team to spend some time reading the responses before listing the top three ideas for improvement.

Resources:
- Some testers!
- Video production devices:
  - smartphone
  - microphone
  - video camera

Phase 6: share and submit

Time: 1-2 hours

Aim of session: Prepare an entry for the Pioneers challenge.

Objectives:
- Reflect on your project as a whole and document the experience.
- Make a video, and share your code.
- Submit your make to the Raspberry Pi Foundation Pioneers competition.

Session activities:
- Ask the team to spend some time reflecting on their experience of Pioneers so far. You could run a sticky note session. Discuss the different answers with the group.
- Explain that entries must be submitted to the competition in the form of a video. Use some of the official Pioneers videos to help.
- Next, combine the footage you have captured to make your video for the project. You will also need to share your code. The best way to do this is using GitHub.
- Show your video to someone who wasn't involved in the project. Can they tell what the project is, and understand what the tricky bits were?
- Finally, submit the entries to the Pioneers website.

Resources:
- Sticky notes
- Pens
- Video production software:
    - Movie Maker (Windows)
    - iMovie (Mac)
    - Smartphone video editing apps (e.g. iStudio from YouTube)
    - YouTube online video editing software

Teaching hints and tips

From here on out, this booklet will provide some tips on workroom management, as well as a few tricks we've picked up during our time in the trenches teaching computer science. It's primarily for those non-teachers among us who are possibly working with young people for the first time, but we think everyone can benefit from what follows.

Before we start on the tips, here's some food for thought about running an out-of-school programme.

When working with young people outside school it's important to remember that very fact: you're not at school, so they are not your pupils as such. You don't need to be a stern disciplinarian to hold the interest and focus of a group of kids, especially not during a competition like Pioneers. These kids have requested to be here and they're attending your sessions to learn from you, to soak up your wisdom and have you coach them to success.

Remembering that will put you in good stead when working with your team. Being in the workshop with you to complete this task is a privilege, not a right. You are allowed to mentor your team without pulling out your hair, having to shout or being grumpy. Anyone on your team who is disruptive, dangerous or detrimental can leave. We are trying to help young people to develop skills and knowledge that will set them up for the future, and part of that is understanding that there are codes of behaviour in the workshop that they are expected to follow. Those who cannot fulfil the obligations of responsibility and maturity can wait for the next cycle of the competition. Don't be afraid to speak to the school, parents, or social group about a team member's behaviour during the Pioneers programme if you feel you need to.

These are guidelines for life that essentially boil down to two words: be cool. If you see a kid doing something they shouldn't, or behaving in a negative way, tell them it's not cool. Ask them to explain why their behaviour might be a bad idea, rather than getting on their case. It's a more positive way of working for everyone.

Remember: you're not their teacher; this isn't school. We're all here to work together to make something awesome, but nobody is forcing anyone to be here!

Gaining the attention of the group

Sometimes in the middle of a flurry of activity, you need to attract the attention of the group all at once. Everyone has a different method of getting attention. Some teachers have the knack of making a 'thunderclap'. Other noise-making techniques are cool: gongs, bells, call and repeat, clap and repeat, hands up. Pick one you like, and stick to it. If it doesn't work for you, try something new next time. Just don't chop and change during the same day – it'll confuse the kids.

For a call and response, you say something out loud and the teams respond with a counter sign:

- "Alright Stop!" / "Collaborate and Listen!"
- "Allons-y!" / "Geronimo!"
- "Peanut Butter!" / "Jelly Time!"
- "Shark bait!" / "Brew Ha Ha!"
- "Nanananananananananananana…." / "Batman!"

Sound makers work well to attract attention. You could try using a bell, tambourine, gong, drum, rain stick, laptop sound, buzzer, noisy toy, musical instrument, arc welder, rivet gun, hammer, etc.

Physical Responses require the teams to give you their full attention.

- Hands up, tools down. This is a less sophisticated version of the 'Spock' that only requires a raised hand to be mimicked.
- The Spock. As above, but you split your fingers down the middle in the Vulcan salute (mostly useful for Trekkies).
- Countdown. Put your hand in the air and count backwards on your fingers from five or three. The teams should be silent when you get to zero. Give them a cue: "five, four, three, two, one … and voices off, please."
- Simon says. This is best for younger groups. Make a series of movements until all the kids are copying you. Call out each move as you do it: "touch your nose, hands on heads, fold your arms, listen up."

The 3 Fs: fun, fair, firm

The best mentors aren't those who shout and rail against their teams at the drop of a hat. You'll find that being a normal human being, rather than emulating Professor Snape, will gain you far more respect. The best way to handle your teams is to use the Three Fs in the workshop: fun, fair, firm.

- In that order. You'll find you earn way more respect if you work this way.
- Fun. This isn't school. Remember that we are here to have a fun time doing something cool. We all want to have a good time. Make jokes and be positive when you deal with kids, even in a negative context. Discipline doesn't have to be a negative interaction.
- Fair. Admit your mistakes. Apologise if you are wrong. We are not paragons of wisdom and knowledge; we get it wrong too. Being a human will earn you respect way beyond trying to hold up an image of unassailability.
- Firm. Sometimes you will have to pull a frowny face. Make it quick and impersonal, then forget it. Make sure you mention that it isn't the kid who is bad, but the behaviour which is unacceptable. Explain the outcomes of their behaviour to them in an obvious way. Remind them that we are all trying to achieve the same thing: how is their negative behaviour holding people back?
- Discipline and frowny faces are only really necessary if someone is consistently disruptive, or damaging the experience of other kids. If a kid is being consistently disruptive or dangerous, consult with their school, teacher or parent and let them know. That way, you can ask them not to come again if the behaviour continues, and nobody will be surprised when that happens.
- Report any chronic or serious behaviour issues to parents or the school at the end of the session. You're not dobbing, you're making sure that parents and school know how their kids interact with others. It's not your job to raise their kids: their school and parents need to be informed.
- Be chill. You can always get more upset if you need to, but it is hard to dial it back once you've exploded. Try to have patience with the kids in the first instance. They don't know any better! They're here so you can guide them. If they are afraid of you all the time, they won't ask questions and everybody's experience will be diminished.
- Remember that part of your job is showing these kids how to behave in a collaborative environment. Be chill about stuff first.
- School tries to beat the individuality out of you, but we want to encourage it!
- They are just kids. They often don't really know any better, or aren't paying attention. It's very rare that a kid is a pain on purpose. Those kids get asked to leave.

Communicating with kids

1. Be yourself, first and foremost. Kids can tell when you're being false. Just be relaxed, and do what you do. Remember: you are in the position of mentor because you are innately cool and knowledgeable. These kids want to know what you know; they want to be like you. Kids respond well to sincerity and genuineness, so let yourself be you, sans swear words!

2. That said, be the best version of you that you can. Don't be false, but remember that these kids don't know you personally: you can be anyone you want to be at Pioneers! Use this opportunity to create a positive avatar.

3. Get the kids to ask the people next to them for help first. This benefits all the kids involved, and frees up your time to supervise the really stuck kids or the tough and dangerous tasks.

4. If a kid asks for help, only touch their keyboard if they are significantly behind everyone else and need to catch up. Otherwise, point out the error and let them fix it.

5. "It isn't working!" should always be met with "Why not? Have you read the error log?" RTFM is a real thing, and an important skill for digital life.

6. Answer all questions honestly, but bear in mind the age of the kid. Don't sugar coat anything, but don't give anyone nightmares either. Particularly sticky questions can be answered with "you should probably ask your parents about that, not me."

7. Hugs. Kids may give you hugs when they like you, especially younger kids. It's a normal human response, and there's nothing weird about it. Hugs are ok, but you need to be careful dishing them out as not everyone is as enlightened or cool as you, and they may pass judgement on your openness in an unfortunate way. Top tip: convert it into a high five before the hug lands by offering your hand and saying "five me, bro!" or a similar invitation for alternative physical contact. Tip for enhanced awesomeness: kids absolutely love it if you have a 'secret handshake'!

8. Get down on their level when you talk to them. Sit in a chair, crouch or kneel down. There is a very real physical component to 'talking down to someone'. If you want deep and unwavering respect, always try to 'speak upward' to kids where you can. Be at or below their eye level when you communicate, and they will follow you into Certain Doom. You give respect to get respect.

9. It is OK to discuss illegal digital activities (piracy, torrenting, software cracking, etc.), just don't recommend doing them to anyone, or give tips on how to do them. These things exist, and we are educating kids about the digital world; just don't encourage them to break the law, or show them how. You can also praise the skills of 'hackers' and online mischief makers; just explain that if they aren't using their superpower for good, that makes them villains.

10. Don't let kids talk over you, or another instructor or team member. That's disrespect. If you are talking to the group and you see this, just stop and wait. Tell the group that you are just waiting until everyone is listening. Explain that you hate repeating yourself, or that you hate it when people ask you to explain something you already explained, which shows they weren't listening.

11. If they are talking over another mentor, tap them on the shoulder and signal for quiet. Don't interrupt the flow of the session, just give them 'the look'. Practice your 'look' on your friends. For maximum effect, it should be along the lines of disappointment mixed with impatience. Anger isn't a great response in any situation.

12. If they are talking over another kid, interrupt and ask the person speaking to wait for quiet. Apologise to them for the people who are being rude by not listening. Everyone has the right to have their thoughts and opinions heard in the workshop.

13. If you see a kid getting frustrated by a task, jump in and calm them down by talking them through or helping them past whatever it is that is holding them up. We've all been there; when debugging just makes your brain keel over and die. Twelve-year-olds are prone to tears in this situation at times, especially at the end of the day.
    - Tell them to take a break and get some air, wash their face or grab a drink.
    - Give them some perspective:
        - "It's just words on a screen. We can fix it, no problem. Don't stress!"
        - or "Are you dying?" *No.* "Does it hurt?" *No.* "Then what's with all the tears, dude?"
        - or "Is the crying making it any better?" *No.* "Is it solving your problem?" *No.* "Then why do it? I'm here to help you; just ask me!"

Discussions and questioning the group

Often, you'll come up against a wall of silence when you ask a question. This can be for a number of reasons; nobody knows the answer, nobody is willing to be publicly wrong, or the kids are just shy or aren't comfortable with you yet. Don't take it too hard. Just softly encourage participation with a few simple phrases designed to make the room feel like a safe place to be wrong and have a go.

Sometimes you might need to rephrase the question, too. Kids don't always have the inherent skills or experience you do. If you find this happening often, try using these tips:

1. Don't point. This is an inherently aggressive and overbearing action, and it will freak kids out. Make eye contact and ask them by name to answer. If you can't remember their names, 'buddy', 'mate' and 'dude' are all fine. If you absolutely must gesture at a kid, use an open palm and gesture with your whole hand (an old military trick!).

2. Avoid 'yes' or 'no' questions where you can; open questions are way better. Start your questions with 'what', 'how' or 'why'. Also try 'describe', 'explain' or 'can you tell me…?'

3. "Whaddya reckon…?" This makes it sound ok to guess and adds a casual note to the attached answer. We want to encourge participation in the beginning, in order to build a culture of safety in answering. This technique works best when nobody has their hand up. Ask someone to 'take a crack at it', or 'have a go'.

4. Test understanding by giving the wrong answer and asking if it's right: "So, if I stuck my finger in the socket…I'd be fine, right?" This allows the kids to ground their ideas from a place they know to be wrong, and express their opinion as the correct one. This will be empowering for them.

5. Try to test their ideas by asking for, or offering, a different context or opinion:
    *   "So what you're saying is that …."
    *   "Does anyone disagree with that idea?"
    *   "Could there be another way/answer/solution?"
    *   "Awesome, but what about…?"
    *   "Are there times when that wouldn't be the case?"

6. Leading questions: sometimes you need to provide the answer in the question. This narrows down the scope of possibility and allows less experienced kids to feel safe having a go. You can also gesture subtly at the right answer to provide a subconscious clue - just don't be too obvious!
    *   "Do you think it's A or B?"
    *   "Will this script make the green light flash, or the red light?"
    *   "Where is the mistake in this line of code?"

7. Use rhetorical Questions. You don't actually want an answer, you just want them to agree or disagree with you. This encourages them to join you in an understanding or viewpoint rather than telling them a fact or quizzing them, and breeds trust and camaraderie. Rhetorical questions work particularly well when you can throw out a whole string of them and build the hype really quickly:
    *   "How cool is Johnny's animation?"
    *   "Isn't that crazy?"
    *   "How awesome is it when your code finally works?"

8. Give them time to answer. The kids in the group are often coming at these ideas for the first time. Let them cogitate a bit, and don't expect them to be able to answer too quickly. Allow them time to think about the idea, then ask for volunteers to answer.

Bad behaviour/discipline

1. Don't make a big deal about kids misbehaving. The old "I'm not angry, I'm just disappointed" works like a charm; your mum did it because it's a real thing. These days, try something like: "Oh man, I thought you were cool."

2. Be casual in the way you discipline kids publicly. Make a joke or point out that bratty behaviour is for brats. However, if they are interrupting you while you are moderating, feel free to stop and address the situation before continuing to speak. Don't let anyone be rude to you in that way. It's showing disrespect, and they'll expect you to listen while they speak!

3. An awesome way to get kids to stop talking over you is to give them a good reason to listen. Try:
   - "Buddy, while I'm talking you need to be listening, or you won't get it and you'll look silly when you ask 'what are we doing?', when everyone else already knows."
   - "One of the most annoying things ever is when I have to repeat myself a hundred times for people who aren't listening. It annoys everyone else who has already heard it too, when they have to hear it again."
   - "Everyone else is trying to get better at doing this thing, and you're making it hard for them to do that."
   - "Man, everyone is going to get sick of waiting for you when I have to keep stopping to ask you to be quiet and listen in. Like right now. Have a look around: you're slowing us all down."

4. If team members are talking over another mentor and you notice it, tap them on the shoulder or signal them, and silently remind them to listen or stop touching their work. Try not to interrupt.

5. If a kid is continuing to behave in a way that is detrimental to other team members after multiple warnings, make a note of it and report it to their school or parents. We have a responsibility to make sure that one team member isn't messing it up for all the others, and to communicate with parents about it in a more formal tone. This is usually a last resort, though.

Autism Spectrum Disorder (ASD)

You may get kids with ASD who are sometimes tricky to deal with. Here are some tips for managing the behaviour of ASD kids.

- Speak quietly. ASD kids often have trouble with processing external stimuli. ASD is like having every device in your house on at once: the vacuum cleaner, alarm clocks and a loud lorry driving past, all at the same time. Overloading ASD kids can often result in blowups.

- Get below their eye level. This is a particularly big deal for Autistic kids. They can feel very threatened by a big physical presence. Let them be bigger than you, and you will see them open up to you more quickly.

- Physical Contact. It is unlikely to occur, but sometimes in the workshop you'll need to make physical contact with one of the kids. As far as ASD kids are concerned, it is always better to wait until they make contact with you first. This will allow them to fill the personal space in their own time, when they are comfortable with you.

- Time Out. Sometimes ASD kids just need a quiet space to chill out, away from the hubbub in the workshop. This is cool. Just make sure you have someone with them to keep an eye on them. We don't want them wandering off around the venue alone!

Thank you!

We hope these tips and tricks are helpful to you during your tenure as a Pioneers mentor. Thank you very much for giving up your time and effort to help a group of young people develop their imaginations and create something special. Without mentors, Pioneers couldn't happen, so be proud that you are contributing to a brighter future for these young inventors.