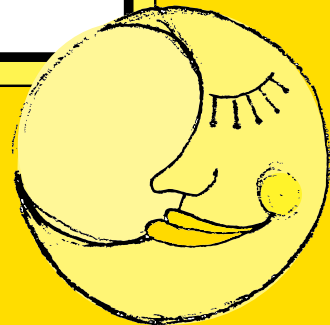


**Young  
Researchers'  
Programme**





# How to use Guide:

The purpose of this guide is to help you (the facilitator) initiate the Young Researchers' Programme in your community. We have created the following three books to help you easily navigate the programme:

## **Book #1: The Young Researchers' Programme Guidebook**

### **Table of Contents**

This section is where you will find the table of contents for the entire guide.

### **Introduction**

This section will help you decide if this programme is suitable for you and your institution. It will provide you with some information about the Young Researchers' Programme including the purpose of the programme, its origins, and the role of the facilitator.

### **Mission and Vision**

We hope this section will inspire you to carry on with our mission and fulfil our vision for the programme. It describes the current programme and our hopes for the future.

### **The Mentor Experience**

This section will help you select the best people to be mentors. The mentors are the foundation of this programme and we want them to feel as supported as possible. This section also includes some tips and tricks for the mentors to help them be successful in their role. One of the most helpful tools introduced in this section is the TASC wheel. This wheel is a vital part of the Young Researchers' Programme, so we recommend all facilitators, mentors and young researchers are acquainted with it.

### **The Young Researcher Experience**

This section highlights the role of the young researchers, as well as opportunities available to them during the programme and skills acquired upon completion of the programme.

### **Hands-on Activities**

This section covers the hands-on activities you can run in your monthly sessions. These activities stimulate critical thinking and demonstrate the necessary skills for conducting research. Within the guidebook, we have included the activities and the instructions for conducting each activity are described on the portable flash cards included in **Book #2: Hands-on Activity Flash Cards**.

## **Evaluation of the Programme**

We are always looking for feedback in order to develop and refine future iterations of the programme, therefore we have developed a series of evaluation tools that we hope you will find useful. These tools can be found in Book #3: The Resource Guide and include: a mentor survey (online tool), mentor evaluation, young researcher evaluation, a conference survey and poster and presentation assessment sheets.

## **Timeline**

This section is designed to keep you, the facilitator, on track. This is a ten-month programme with monthly meetings, public engagement events, and two conferences. We have included a template of the timeline we used when running the programme.

## **Acknowledgements**

We could not conclude the Young Researchers' Programme guidebook without thanking those who made this programme possible. Acknowledgements can be found in this section.

## **Book #2: Hands-on Activity Flash Cards**

This book is a collection of portable flash cards. These flash cards will provide you with step-by-step instructions on how to conduct each activity including the aim, key skills, and key reflections to help stimulate discussion at the end of the activity. Please feel free to get creative and change the activities to better suit your needs.

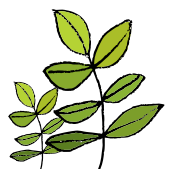


## **Book #3: The Resource Guide**

This book is home to the mentor application form, TASC Wheel, pictures and other resources needed for the hands-on activities and the different evaluation tools mentioned above.

The resources can be printed or projected during the sessions. We recommend printing the flash cards for each mentor to help keep them on track.

This concludes the “How to” section of the Young Researchers Guide. We wish you a successful journey and we hope you enjoy the Young Researchers' Programme!



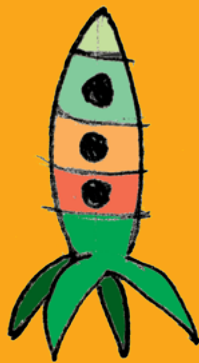
**Book #1**

**Young**   
**Researchers'**  
**Programme**

**GUIDE**

# Table of Contents

## **Book #1 Young Researchers' Programme GUIDE**



### **Introduction**

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### **The Young Researcher Experience**

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### **Hands-on Activities**

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### **Evaluation**

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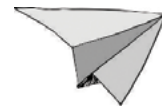
### **Timeline**

Page 18

### **Acknowledgements**

Page 19

# INTRODUCTION



The rest of the guide will consist of instructions on how to run and evaluate the Young Researchers' Programme. These are the tips and tricks we have learned over the last five years, but not all of these will be relevant to your local context. Please make this programme your own and change any parts you wish to make it relevant to the people you are working with.



Welcome to the Young Researchers' Programme! You are in for a truly enriching experience.

The Young Researchers' Programme is a mentorship program that provides young people aged 13-17 a chance to become an independent researcher. All participants are volunteers and these young researchers will learn how to formulate and answer a research question by conducting a literature review, developing a method, performing experiments, and later sharing their results at a conference. Most importantly they will learn how to work as a team, obtain ownership over their work and explore their interests using a systematic approach using the TASC Wheel (more about this method later).

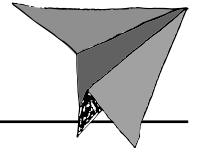
The advantage of the programme is that it forges links and provides a mutually beneficial learning experience between young people, postgraduate researchers and the local community. We are a partnership between an informal science learning organisation and local universities.

As the facilitator of the programme, your role will be multifaceted and packed full of diverse activities and responsibilities. You will have the chance to recruit and train PhD / Postdoctoral mentors, lead sessions designed to facilitate research projects, organise a conference, and everything in between. It's an exciting experience and you will be mentoring the next generation of researchers, industry leaders and science communicators. Please keep in mind that this programme can be run with little to no funding and it all comes down to the creativity and commitment of everyone involved for this programme to be a success.

Now, for a bit of history, The Bath Royal Literary and Scientific Institution (BRLSI) initiated this programme in October 2014 in collaboration with the Public Engagement Unit and Department of Architecture and Civil Engineering at the University of Bath. We recommend collaborating with your local science museum or university if possible as this programme provides a wonderful opportunity for researchers to get involved in public engagement.

The last thing we want to get across is that this is an inclusive programme designed to bring together young researchers, mentors and facilitators from diverse backgrounds and experiences and provide a platform to expand their knowledge, communicate science and have fun!

# MISSION and VISION



## Mission

The mission of the programme is to provide young people an opportunity to conduct self-directed research. The PhD and Postdoctoral mentors will provide support during this process, allowing both parties to foster a strong community of inquiry.

## Vision

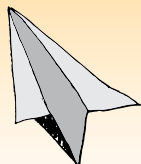
Our vision for the Young Researchers' Programme is to create an inclusive initiative underpinned by three core values: independence, curiosity, and fairness. It is our belief that everyone has the ability to be an expert in their own learning, while creating valuable knowledge for themselves and the world.



# THE MENTOR EXPERIENCE

## A message from the current facilitator

My name is Caroline, the current facilitator of the programme. I will be guiding you through the process of selecting the mentors, as well as providing you with some tips on how to provide support. Let's get started!



## Mentor Commitment

Being a mentor is a 10-month commitment. Mentors are expected to:

- Attend a monthly planning session (approximately 1 hour)
- Attend a monthly activity session with the Young Researchers (approximately 4 hours)
- Attend a training session before the programme begins (approximately half a day)
- Contribute to the conference writing 500 words of your experience and producing a 3-minute presentation about your experience (each conference is approximately 3 hours long)

## Mentor Selection

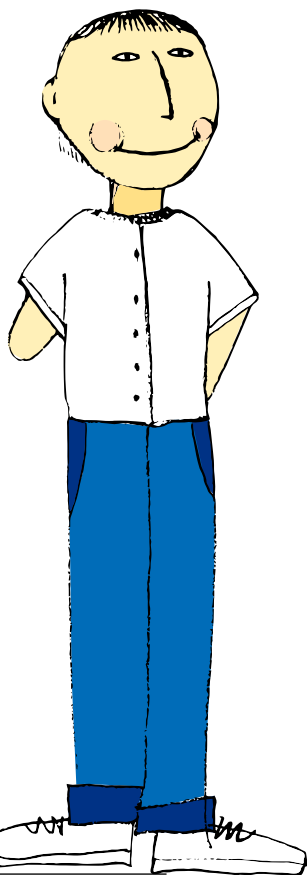
The process of selecting the mentors has two stages: advertising the programme and forming a recruitment team.

In stage 1, you will need to get the word out. To do this, locate a key individual at the University that you are collaborating with and advertise the programme to PhD and Postdoctoral researchers at that institution. You could approach their public engagement team, the team that run training for PhD students or an academic with a commitment to public engagement and outreach. Interested postgraduate researchers will be invited to complete a mentor application form (see example located in **Book#3: The Resource Guide**).

In stage 2, you will need to form a recruitment team of three or four committed individuals to review mentor application forms. This team is responsible for reading and scoring each application received in order to produce a shortlist of candidates that meet the key mentor requirements (see below). You could include yourself and people from the participating organisations.

## Key Mentor Requirements

We have found that having mentors from a mix of disciplines can be invaluable. Depending on your interests and needs you may wish to select mentors so they all have a focus on Science, Technology, Engineering and Maths (STEM), or who have a Humanities, Arts and Social Science (HASS) background. However we have found that a mixed group of mentors can create a more enriching and meaningful experience.





# THE MENTOR EXPERIENCE

## TO SUPPORT MENTORS

- **Monthly planning sessions:**

Provides mentors the opportunity to plan a session and deliver it

- **Debriefing session:**

- + Review the session with mentors. What worked and what didn't?
- + Were there any particular issues that arose with the young researchers?

The debriefing sessions are about sharing experiences with the whole group and finding support if needed

When reviewing the mentor application forms, please be mindful of the following mentor requirements:

1. An understanding of how to provide support and previous mentoring experience

Remember: The aim of this role is not to direct research, rather to supervise from the sidelines and provide resources and advice when needed.

2. An example of a creative activity suitable for the young researchers to undertake that would enable them to acquire an understanding of research and / or a research skill
3. The ability to provide a succinct and simple summary of their research.
4. Demonstrating enthusiasm and a commitment to the programme
5. The willingness to adapt, grow and learn

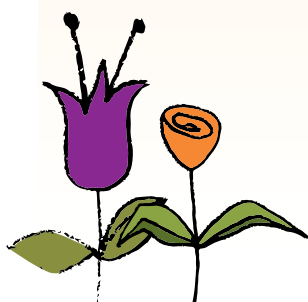
We suggest allocating a mark out of five for each section on the mentor application form allowing you to easily determine your top candidates. A score of two or less on any of the sections would suggest that those candidates might not be suitable for the mentor role. However, it is important to promote a positive experience to all interested researchers, therefore please take the time to provide unsuccessful candidates with constructive and helpful feedback regarding other programmes, training or workshops that will help them acquire relevant skills enabling them to re-apply in the future.

We invite selected mentors to attend the 'Young Researchers Annual Conference'. This provides incoming mentors with an opportunity to speak to outgoing young researchers and mentors to learn about their experience in the Young Researchers' Programme. This conference would normally take place one or two weeks before the new programme begins or in July before the end of the academic year (see the timeline on page 22 for more information).

## Support for mentors along the programme

### Monthly Planning session

A few weeks prior to the monthly session mentors will receive the upcoming session plan. It is at this time that we encourage inviting mentors to a planning session. This will give mentors a chance to provide valuable feedback regarding the upcoming session. This meeting is one of the highlights of the programme as it gives the mentors a chance to help design each session and the overall programme by contributing creative ideas for the different hands-on activities. Ideas are then discussed and agreed upon based on the aim of each session. It is a great team building session that emphasises the importance of collaboration and interpersonal



# THE MENTOR EXPERIENCE



## TIPS

- Be versatile
- Foster independence in your young researchers
  - Focus on the young researchers' needs
  - Ownership for young researchers is key
- Teamwork

communication. At this session we also discuss who will lead the hands-on activities allowing each mentor a chance to be a leader during the monthly sessions.

### Debriefing session

At the end of every monthly session, we dedicate a few minutes to host a feedback session with the mentors and facilitators. At these sessions, we discuss the strengths and weaknesses of the session and how we can improve in the future. This session is critical to expressing any concerns that may have arisen. We work as a team to determine if others are experiencing similar issues and help each other in order to overcome obstacles. This is also a good time to discuss things that worked well with the rest of the team.

This is all the information I have for you regarding mentor selection and training. The rest is up to you! This is Caroline signing off. You may want to read the next section from Stacy who has a message for new mentor.

### A message from a previous mentor

This part of the section is written specifically for the mentors. My name is Stacy, a previous mentor of the programme, and I want to share my experience with you including some tips to help you get the most out of your time in this programme.

### Getting started

Congratulations, the facilitator of the program has selected you and a few lucky researchers to mentor motivated young people with their research projects. This means that you possess qualities that will make you a great mentor such as excellent personal communication skills.

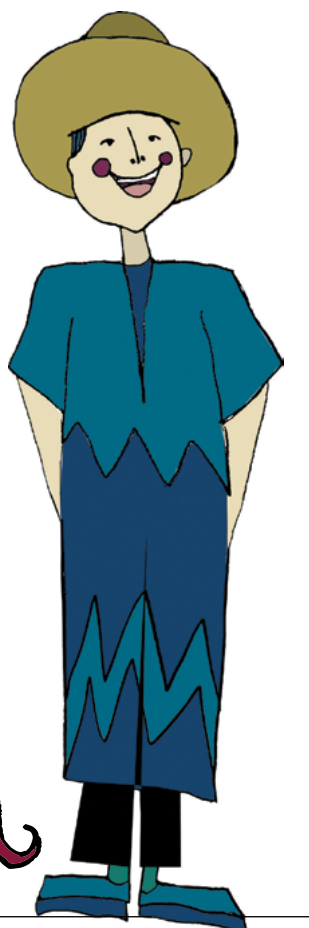
From my experience here are few things to remember:

### Be versatile

The Young Researchers will have the opportunity to select their own mentor based on your expertise. This helps them establish ownership over their projects. During this selection process, you will have a chance to highlight your experience and expertise, as well as your versatility and willingness to read up on their interests should they select you as their mentor. Remember the age of your audience when you make your pitch during this selection process and tailor your language to their level.

### Ownership

Your role is a mentor and not a researcher. I know this may be a change; however, understanding the differences in these two roles is critical for the success of both you and the Young Researchers.



# THE MENTOR EXPERIENCE

- Gather/organise the resources and knowledge you have and those you'll need
- Identify what the task is
- Generate ideas to think about the task
- Decide which idea is the best
- Implement that idea
- Evaluate your work
- Communicate your research

Mentoring is more about guiding others to ensure they are on the right track, rather than directing the technical aspects of their work. Please remember, this is your Young Researcher's project and not yours. Your focus should be on the big picture, so they can figure out the intricacies of getting their work done independently.

## Teamwork

This programme is structured around teamwork. You will be using something called the Thinking Actively in a Social Context (TASC) wheel during each session, to guide discussions for each research project. As the name implies, this style of teaching encourages teamwork. We will discuss the wheel next, however, this section is about mentoring in teams.

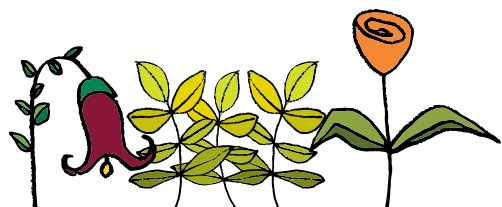
You will work in many teams of all sizes during this programme. One of the first teams you will be divided into will be your smaller supervisory team. This group will have around five or six young researchers (this will depend on how many young researchers are enrolled in the programme, do not worry if you have four young researchers in one group, it works just as well) plus another mentor. You will spend lots of time working with your co-mentor, so take the time to get to know them and their expertise. Supporting each other and knowing where each other's strengths and weaknesses lie is critical and will help you to share the workload effectively. If you are a more experienced public speaker, take the lead during a communication session; if the other is an expert in bioengineering lab-grown meat, let them take the lead if a young researcher's project is about tissue regeneration. Communication is the key to your team successfully reaching your goals.

Additionally, you will be working with the rest of the young researchers during each interactive activity. These activities promote working in a large team to try to understand how each activity applies to their research project. These group discussions are critical to everyone's success and having the confidence to engage in a larger team will be encouraged during this programme.

## Thinking Actively in a Social Context (TASC) Wheel

Now back to the TASC Wheel. Your co-mentor isn't the only best friend you need to make during this programme, this wheel should become your best friend too!

Originally developed by Belle Wallace in the 1980s, this wheel provides a framework for critical thinking and problem-solving skills in students. Each section of the wheel represents key stages in answering a research question, however this wheel has been



# THE MENTOR EXPERIENCE

designed specifically for teamwork. As a mentor, encourage your researchers to use it. For example, the first stage is “Gather/organise—What do I know about this?” This stage leads to completing a literature review about a question posed by the young researcher. However, the young researchers may have never heard about a literature review before or do not have access to literature. This is where you step in as a mentor to teach them about a literature review and help them obtain and critically read literature. A second example would be “Evaluate—How well did I do?” This stage involves evaluating data and the young researchers may need help with selecting the best tool to statistically analyse their data. A final example would be the stage “Communicate—Let’s tell someone”. This stage is all about communicating their hard work, but the young researchers may have limited experience making a poster or giving a presentation. This is where your expertise comes in to provide examples regarding both of these communication formats.

The TASC Wheel



This stage involves evaluating data and the young researchers may need help with selecting the best tool to statistically analyse their data. A final example would be the stage “Communicate—Let’s tell someone”. This stage is all about communicating their hard work, but the young researchers may have limited experience making a poster or giving a presentation. This is where your expertise comes in to provide examples regarding both of these communication formats.

Use this wheel to your advantage to inform what stage your young researchers should be at and what input is required from you at each stage. The purpose of this wheel and this project is to help young researchers to develop an independent research project and in order to do that their research needs to tell a story with a beginning (question and background), middle (method and results) and end (discussion and conclusion). This wheel can help with that.

Use this wheel to your advantage to inform what stage your young researchers should be at and what input is required from you at each stage. The purpose of this wheel and this project is to help young researchers to develop an independent research project and in order to do that their research needs to tell a story with a beginning (question and background), middle (method and results) and end (discussion and conclusion). This wheel can help with that.

## Good luck!

We have come to my final tip to help you succeed as a mentor in this programme and that is to remember to have fun! This is a once in a lifetime opportunity as a PhD student or Postdoctoral researcher, so make it a great experience. Also remember to ask for help when needed from your facilitator and other mentors. You are working with great individuals who want to help. Good luck on what’s sure to be an amazing experience filled with great research from amazing young researchers!



# THE YOUNG RESEARCHER EXPERIENCE

## IMPORTANT

Young researchers should:

- Recognise and value themselves and others as knowledge creators
- Research something that interests them
- Work within a time frame
- Gain confidence to present in front of an audience
- Be responsible for their own research and learning
- Reflect critically on their research process, how they learn and about themselves
- Engage with and create a community of inquiry

Young researchers are the focus of the programme, therefore we want to provide you with a better understanding of the types of individuals you will be facilitating and the experience we hope they will gain from this programme.

The young researchers are 13-17-year-olds who join the programme voluntarily. They come from diverse cultural and socio-economic backgrounds and bring with them their own unique life experience. Under the mentorship of PhD or Postdoctoral researchers, they will learn the ins and outs of what it is like to be a researcher in STEM and social science subjects.

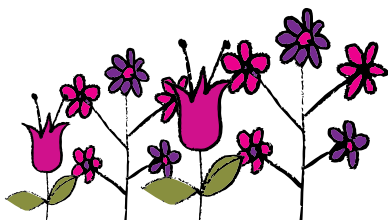
The young researchers attend one 3-hour session every month for nine months. Additionally, they attend the Annual Young Researchers Conference as their final event. We run ours on a Saturday afternoon, but you may want to choose a different time. During their time on the programme, the young researchers will conduct their own research project and communicate their findings to a public audience at a conference.

Further reinforcing the independent nature of this programme, young researchers are given the opportunity to select their mentors based on the mentor's expertise and their own interests at the beginning of the programme. However, they are not bound to these groups and are encouraged to find support, expertise and knowledge from other groups, mentors, and young researchers. The ability to communicate and receive feedback enriches their work, but also allows them to contribute to the work of the other young researchers.

This unique experience provides a great number of additional opportunities for young researchers to grow, some of which are listed below.

Young researchers can:

1. Recognise and value themselves and others as knowledge creators
2. Create and research a question of particular interest to them
3. Develop the ability to enquire in a disciplined, creative and critical scientific manner
4. Work within a time frame
5. Build their communication skills and gain the confidence to present in front of a large audience



# THE YOUNG RESEARCHER EXPERIENCE

6. Accept responsibility for their research and learning
7. Critically reflect on their learning, the research process, and themselves
8. Make a valuable contribution to the learning of other people
9. Make an action plan of what they wish to research next

We want to stress the inclusive nature of the Young Researchers' Programme, that is, everyone, no matter their socio-cultural background, is welcome to join the programme. Your job as the facilitator is to help participants realise their potential as a researcher and provide support in order to help them make the most out of their time in this programme.



# HANDS-ON ACTIVITIES

Session 1

## Nice to meet you

Session 2

## The research question

Session 3

## The art of listening and trusting

Session 4

## Evaluating information and resources

Session 5

## Collecting data

Session 6

## Engaging the public through posters

Session 7

## Analysing data

Session 8

## Communicating the research

Session 9

## Reflective writing for publication

In this section, we have highlighted the aims of the hands-on activities offered in this programme: skill-based hands-on activities and thinking philosophically activities.

### **Skill-based Hands-on Activities**

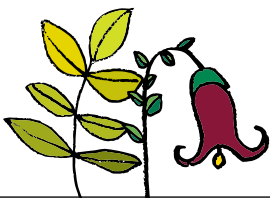
The aim of the skill-based hands-on activities is to provide young researchers with the opportunity to learn the techniques necessary to conduct a research study. Young researchers will work in their smaller supervisory team to complete the activity and are then able to reflect on the significance of the activity within their own research. Young researchers will also have the opportunity to share their findings with the entire group of young researchers and mentors, enriching their own knowledge with that of others. Specific details regarding the aim, resources needed, how to conduct each activity and key reflections can be found on portable flashcards in **Book #2: Hands-on Activity Flashcards**. The flash cards are designed to guide mentors through each of the hands-on activities. Keep in mind that these activities are just suggestions and are meant to be used as an enjoyable aid to highlight key skills in research.

### **Thinking Philosophically Activities**

The thinking philosophically activities are aimed at supporting students to explore ethical issues relating to scientific research and its impact on society. They provide the young researchers and mentors with the opportunity to provoke thought and discussion about the philosophical aspects of science. The idea is to consolidate and extend knowledge and understanding of science from a critical stance. You can choose to use the activities in different ways in the session, as a short ten-minute reflection, as a starter, plenary, or as a debate or discussion. You can choose to work through every question or just focus on one or two, it will depend on the needs of the group and the time you have available.

There are two resources for doing this, one is called **Thinking Science**, which is a booklet produced by the Philosophy department at the University of Bristol. This resource contains areas of science such as biology, physics, chemistry, and the last section is about thinking scientifically, this is the one we use in our sessions, but feel free to explore all and decide which of them best addresses the group's needs.

The other resource is called **PERFORM**, and it stands for Participatory Engagement with Scientific and Technological Research through Performance. It is the outcome of a European research project whose aim was to investigate how can performing



# HANDS-ON ACTIVITIES

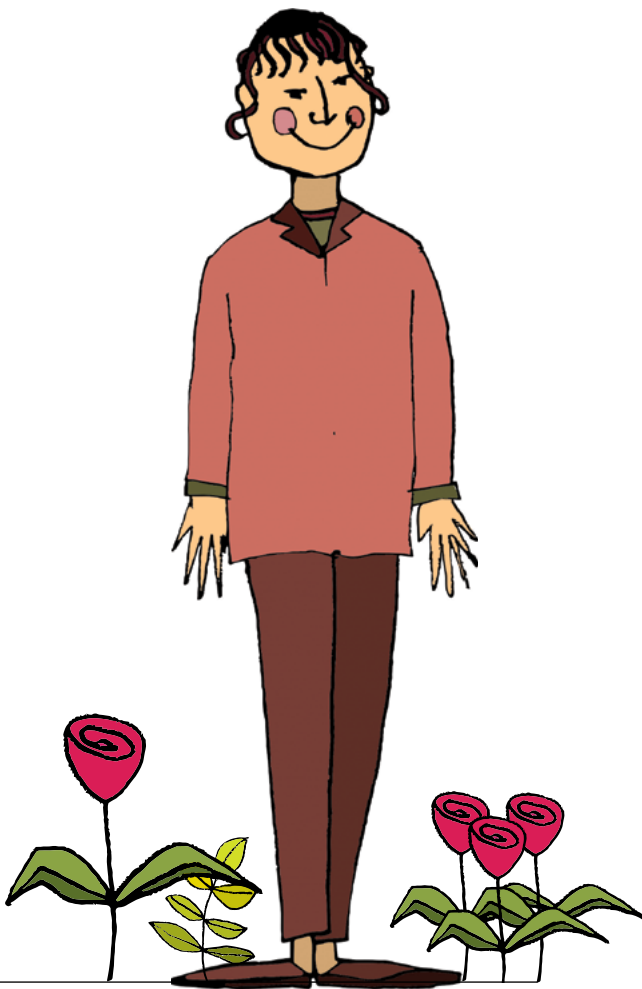
## For all sessions TASC Wheel

arts foster motivation and engagement with STEM subjects to overcome the distance between young people and science.

As well as these two resources we have also included a presentation that supports mentors and facilitators to implementing the activities in the sessions. The presentation and both of the booklets can be found online, the links to them are in **Book # 3: The Resource Guide**.

For these activities, we recommend leaving enough time for discussion in order to reflect on what the young researcher have learned and how it applies to their research. These discussions should occur in their small supervisory groups to begin with. There is no right or wrong way to reflect and young researchers are encouraged to share their insights with the bigger group in order to view each activity from a variety of perspectives.

We recommend having at least one to two activities per session in order to promote an interactive, thought-provoking, and most importantly a fun session. We have added some resources to **Book #3: The Resource Guide** to further discussions for both the skill-based and thinking philosophically activities.





# EVALUATION

In order to ensure that the activities and sessions outlined in this programme are suitable for the current young researchers and mentors we have created feedback sheets to be used at the end of every session. The feedback obtained from these sheets can be used during the next planning session in order to amend the programme / sessions accordingly.

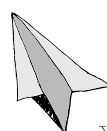
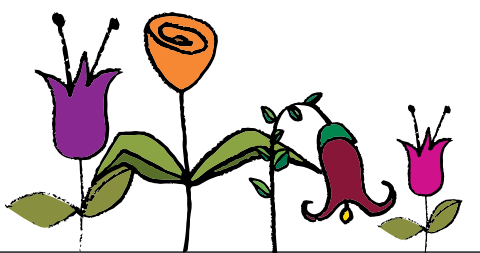
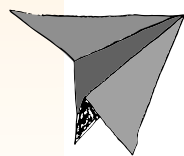
Feedback from the debriefing session mentioned earlier can also be used to make amendments to the programme.

Additionally we have included assessment sheets for the posters and presentations, as well as surveys to evaluate public engagement events such as the Annual Conference. All of these tools can be used to adapt and improve the programme in your setting.

The following are some of the tools that can be found the Book #3: The Resource Guide:

Evaluation tools included  
in the Book#3-  
The Resource Guide

1. Monthly mentors and young researchers feedback sheet
2. End of programme mentors survey (online only)
3. Poster assessment sheet
4. Presentation assessment sheet
5. Conference survey



# TIMELINE

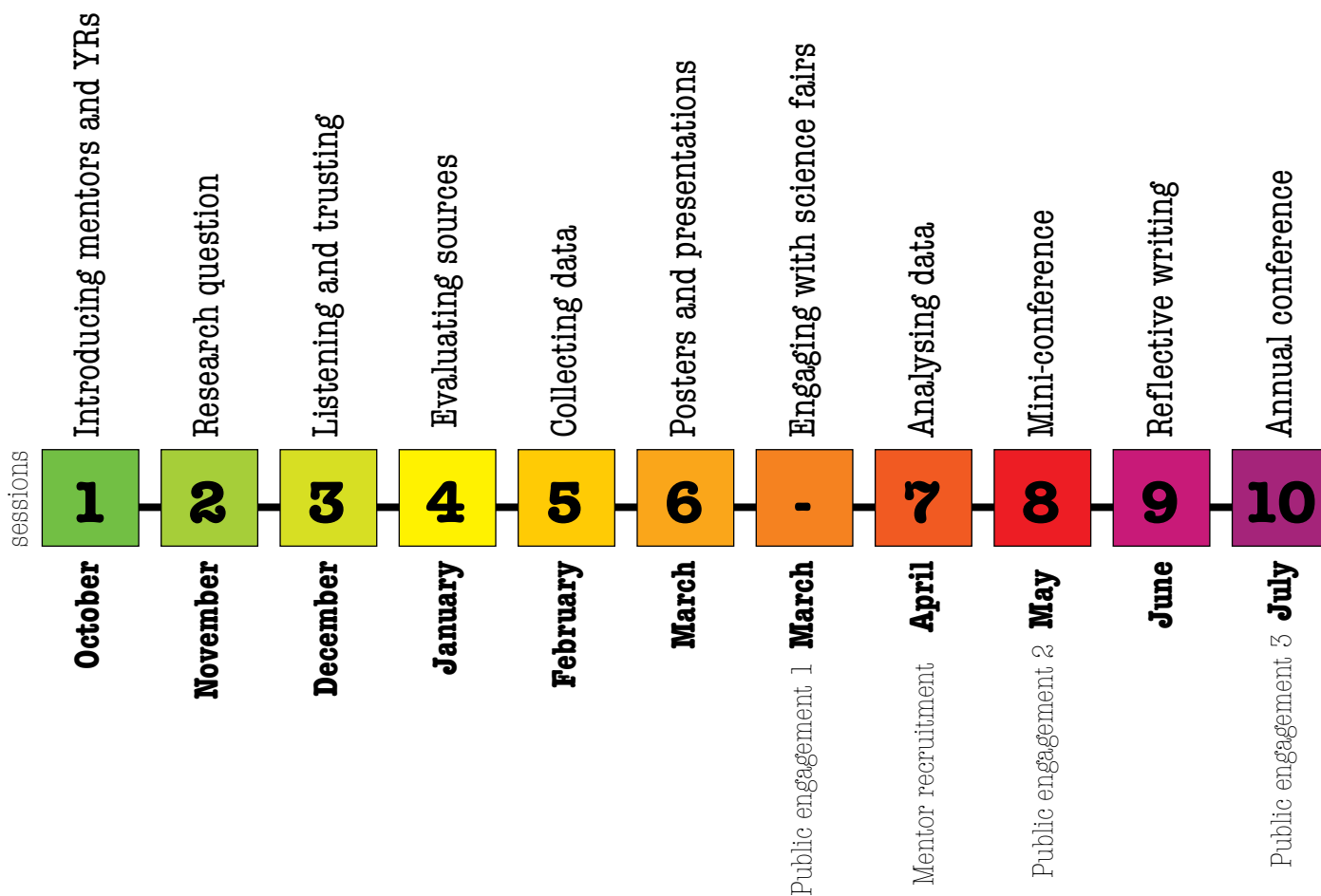
Below you will find a template that we used for the YRP. We have included the public engagement events and some of the processes you need to put in place in order to get the programme up and running. Please feel free to adapt it to meet your needs.

This section provides an example of how the sessions are arranged over the course of the programme. We have also included the processes the coordinator needs to put in place to get the programme up and running.

This programme lasts nine months and includes monthly sessions. Sprinkled throughout this program, there will be at least four public engagement opportunities including the following:

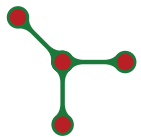
1. A science communication event in the local community for example at a science festival
2. Mini conference with poster gallery
3. Annual end of programme conference
4. A visit to the university where mentors will organise visits to the different labs

We also suggest planning a visit to the collaborating university to give the young researchers a taste of what an academic research facility looks like. Encourage the mentors to organise tours for a variety of labs.



# ACKNOWLEDGEMENTS

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Science communication  
for public engagement

The Young Researchers' Programme was initially devised by Paul Shepherd (University of Bath), Paul Thomas (Bath Royal Literary and Scientific Institute) and Marie Huxtable in 2014 with funding from the Public Engagement Unit at the University of Bath. Through their leadership and the support of many others we are on the 5th iteration of this program and would like to share our experiences so that others can run their own Young Researchers' Programme.

We would like to thank all those involved throughout the years including Helen Featherstone, Ed Stevens and Robert Cooper from the Public Engagement Unit at the University of Bath and a huge thank you to all of the parents, young researchers and mentors who have contributed their time and effort allowing this programme to become a success.

A special thank you goes to all the mentors that have been part of each programme, their enthusiasm, commitment, and generosity is a key ingredient for the success of the young researchers. Many of them have contributed to the design of some of the hands-on-activities in this guide.

We would also like to give a special thank you to the authors of this programme guide Stacy Ramkissoon from the University of Bath, Caroline

Kuhn from Bath Spa University and Alexandra Kuhn an artist and graphic designer.

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