



## A Quick Start Guide

### Introduction

NOIRLab's [Teen Astronomy Café](#) educational program brings the excitement of scientific discovery to learners of all ages, providing opportunities to explore astronomical data using the same tools as professional astronomers. We have adapted a version of the program for use by informal and classroom educators: [Teen Astronomy Café – To Go!](#) This series of stand-alone activities, or **Café Instant Packs**, can be as simple as a classroom activity or a more comprehensive event requiring additional staff and planning. A Café Instant Pack can be used in a variety of formal and informal, online and face-to-face, settings including advanced middle school through college classrooms, home-school students, self-study, museum classes, summer camps, and library programs.

This guide will allow formal and informal educators to implement the program quickly with minimal effort. This streamlined “quick start” adaptation is scalable to your needs and this guide will help you get your students involved immediately. Begin your exploration of the Universe today!

### Setting the Stage

A Teen Astronomy Café – To Go! Instant Pack consists of five resources to use in your program:

1. A pre-recorded **presentation video** by a scientific expert that explains the concepts involved and how astronomers use observations and data to reveal secrets of the Universe.
2. A set of the **presentation slides** used in the pre-recorded presentation for use by the leader of your event. Many of the presentations include presenter notes.
3. An **interactive Python Notebook** (hosted in Google Colab) based on real scientific data and/or tools, which allows learners to interact and succeed in scientific discovery.
4. **Teacher Guides** for each activity.
5. **Student worksheets** that guide the learners through the Python Notebook as they make connections between the science and data/tools.

The presentation provides background information on the topic and on doing the activity while building excitement and motivation. The presenter has the choice of using the pre-recorded presentation, or using the PowerPoint and presenting it themselves. The Teacher Guides provide tips for leading the Python Notebook activity, including questions to probe students' understanding and common pitfalls encountered in the activity.

A typical Teen Astronomy Café – To Go! Instant Pack lesson takes 60–90 minutes and introduces one key astronomy concept followed by a computer-based activity. Activities cover a wide range of concepts, allowing learners to take a deep dive into topics ranging from spectroscopy to gravitational dynamics. Plan to familiarize yourself with the activity before presenting it to your students.



A typical outline of an Instant Pack activity would be:

1. **Introduction and logistics.** Welcome participants, go over logistics such as access to technology, learning environment expectations and etiquette, etc.
2. **Presentation on the topic.** Each presentation includes a suggested activity to introduce a phenomenon related to the theme of the instant pack. The phenomenon develops student curiosity and questioning prior to the presentation. The presentation may be administered by showing the recording or by presenting the slides and notes. The presentation should include opportunities for the students to interact with the speaker and ask questions of the speaker.
3. **The Python Notebook activity.** Students may work on this activity individually or in groups of 2–3 students, depending on your needs and computer availability.
4. **Debrief.** Students share what they learned with the group and have a chance to ask follow-up questions after the activity.

## Exploring the Topics

The interactive Instant Pack Notebooks are Python Notebooks and run with Google Colaboratory, or Colab. Each notebook contains Python code that can be run to create simulations, access data, perform calculations and manipulate data. Python coding knowledge is not necessary to use the notebooks but there are some instances where learners are asked to edit small sections of code.

Python Notebooks are a great way for students to manipulate data without having to learn coding. The code appears for the students in cells that they can run to see the output. No coding knowledge is necessary to use a Python Notebook and advanced students can see the code and manipulate the code. Specific guidelines on how to use a Python Notebook are included in the teacher guides for each activity.

Our current Teen Astronomy Café – To Go! Instant Packs include:

1. [Black Holes](#)
2. [Black Hole Orbits](#)
3. [Breaking the Solar System](#)
4. [Exoplanet Atmospheres](#)
5. [Gravitational Lensing](#)

## What You Need to Lead a Teen Astronomy Café – To Go!:

- A physical/virtual meeting space. (A physical space requires a projection screen or the ability to share screens with participants' computers.)
- A computer for each participant or pair. (Learners can work in pairs or individually.)
  - The lead or teacher will need to test the equipment to be used in advance of the activity to make sure that the computers can run the notebooks.
  - Work with your IT department ahead of time to ensure that all computers will be able to access the Python Notebooks.
- A modern browser for each participant's computer. Colab works with most major browsers and is most thoroughly tested with the latest versions of [Chrome](#), [Firefox](#), and [Safari](#). We had the most success with Chrome.
- The chosen downloadable Teen Astronomy Café – To Go! Instant Pack.





## Next Generation Science Standards

In terms of formal classrooms, Teen Astronomy Café – To Go! incorporates the three-dimensional learning style of the Next Generation Science Standards (NGSS). Students actively engage in analyzing data about astronomical systems using a variety of models and tools that closely resemble those of professional scientists. Each of the cafés engage students in science and engineering practices as they explore the disciplinary core ideas and cross cutting concepts. Many of the activities include open-ended questions that allow students to further explore the topics that interest them. Refer to the Teen Astronomy Café – To Go! [3-Dimensional Learning Design](#) document to learn more about how each Instant Pack incorporates the NGSS.

ENJOY!

