

# Guide to Starting a Teen Café Scientifique



This guide is based on the experience Café Scientifique New Mexico (<http://www.cafenm.org>) has accumulated in running a successful program for high school age teens in four diverse communities in northern New Mexico—Albuquerque, the Española and Pojoaque Valley, Los Alamos, and Santa Fe.

We will begin with a description of the general form of a Café Scientifique program (commonly called Science Cafés in the U.S.) and our motivation for reaching out to teens, followed by a discussion of the five core design principles for a successful teen Café program; we then provide background on how we have implemented these principles. We hope this guide will be useful to others who might wish to start their own program, and we welcome your comments on this guide and news of your experiences designing a Café Scientifique program in your community.

## Introduction

### ***What is a Café Scientifique?***

Café Scientifique programs are a means to engage people of all ages and walks of life in discussion of current and relevant science and technology discoveries. Such programs—in which people interact with a scientist to learn about some hot science topic in the news—originated in the United Kingdom and France, and have now spread across North America and the world. They are very popular, with over 250 adult Science Cafés across the U.S.<sup>1</sup> Cafés typically are held in pubs and restaurants, but may also take place in other social settings, such as museums or libraries.

Though the details of Café Scientifique programs may differ somewhat, all combine two essential ingredients. First, they take place in an informal social setting where participants can interact easily with each other. Second, they satisfy participants' curiosity about a science topic through lively interaction with a scientist. It is this blend of the two ingredients that accounts for the Café model's growing popularity. The key to a successful Café is interaction. A Café Scientifique program is not a lecture series.

### ***What is the format of a typical Café Scientifique program?***

The typical Café Scientifique program is geared towards an adult audience. The program begins with a short presentation (~20 minutes) on an intriguing topic, providing just enough background to stimulate questions and ideas from the audience without answering everything one ever wanted to know about the topic. The presentation often ends with a posed dilemma, question, or position from which the audience can begin its discussion. A short break ensues to allow the audience members to refill their drinks, ponder the discussion topic, and chat with others at their table. Then the audience regroups and discussion begins in earnest with the presenter and among the participants.

***What is different about a Café Scientifique program for teens?***

An adult Café program format can be successful with teens when the topic is familiar and the presenter is very dynamic and interactive. However, there are topics about which teens know little or nothing or they may be unaware of how it relates to their lives. Some topics do not lend themselves to exploring a question or dilemma. Others may be more abstract or more complex and may benefit from alternative means of exploration and discussion. In such cases, Cafés built around a hands-on activity can be quite successful. Teens relish the opportunity for hands-on exploration, especially after a day in school. The exploration can take many forms, depending on the venue, size of the crowd, and topic. See detailed descriptions of successful program events on page 4.

**Consistently, teens tell us the best part of our program is learning from a scientist about his or her work and having an interactive learning experience beyond the presentation and discussion.**

***Why create a Café program exclusively for teens?***

Teens are the future science workforce and the voting citizens of tomorrow. Having awareness and knowledge of how science, technology, and engineering are changing our world is critical for teens to contribute to society and can enrich their lives. We were motivated to foster lifelong learning behaviors that increased the teens' appreciation and understanding of science in their lives and stimulated interest in science and engineering careers.



**Figure 1: Teens explore blood types (L) and build fuel cell cars (R) at a Café.**

Through our program<sup>2</sup>, we showed that a teen Café can instill attitudes and behaviors that provide a level of confidence and skill for engaging in scientific discourse, thought, and exploration of new and varied topics. Teens can get a deeper appreciation of the importance of science to their daily lives and a desire to stay informed. Cafés can open teens to careers in science, technology, and engineering by giving them insight into the nature of science and the work of scientists.

By providing a teen-centric environment and program, teens can more easily take ownership of their learning and their future. A teen-only Café ensures that an adult audience will not overshadow the teens or make them uncomfortable in asking questions, offering opinions, or taking on leadership roles. It also allows the presenter to focus on the needs and interests of this unique audience.

## Core Design Principles for a Successful Teen Café Scientifique

Our work has identified five core design principles for a successful Café program:

- 1) Teens must have a sense of ownership of and opportunities for leadership in *their* Café program.
- 2) Cafés must be highly engaging and interactive; Café programs are not lecture series.
- 3) Marketing and relationship building are essential to encourage teens and scientists to participate.
- 4) Presenters must be carefully vetted and formally trained to communicate effectively with the teen audience.
- 5) Each site must have a “local hero” who has the energy and commitment to make the Café program a success.

These are requirements necessary for a teen Café program to succeed; yet they allow for adaptation of the model to the local situation. Below we discuss each of these design principles in the context of our teen Café program, but also suggest alternative implementations.

### Design Principle 1: Teens must have a sense of ownership of and opportunities for leadership in *their* Café program.

Teen ownership promotes the notion that each of the teens is making a free choice to learn science in a manner that works for them. Teen leadership conveys a message that it is cool to be interested and active in science. A sense of ownership and commitment to leadership makes teen leaders trusted sources of critical feedback to the program staff. Teen leaders can help the Café program staff stay attuned to the needs and interests of teens and suggest ways to continually improve the program.

In Café Scientifique New Mexico, we formed a Youth Leadership Team (YLT) in each town to stimulate this sense of ownership and leadership. The YLTs make small and large decisions about how we conduct the program. They run the meetings, contribute ideas about science topics, recruit their peers, and participate in evaluations of how things are working. Unlike at school or home, they have the opportunity to take charge.

At a typical Café, youth leaders fill the following roles to ensure an enjoyable and successful program. A group of youth leaders arrives a half hour early, and some of them begin to set up the food table. Another group sets up a greeting table and staffs it until the presentation starts. They greet people as they arrive and get them to fill out a card with their contact information. We use the contact information to remind teens about upcoming meetings and for a door prize drawing. Those who have



Figure 2: Building fuel cell cars.

brought friends in a car pool can fill out a special form and get a small stipend to defray the cost of gas. Car pools provide transportation to teens that might not be able to attend otherwise.

The 1.5-hour program begins as teen leaders formally welcome their peers and serve refreshments. After brief socializing, a teen leader introduces the presenter, giving an overview of his or her background. (Some teens enjoy doing this and value the opportunity to improve their public speaking skills.) The presentation involves lively give and take with the audience so that the scientist can fully engage them. The presentation and discussion may be followed by a related activity such as game play, a computer challenge, or an experiment. At the end of the program, a youth leader thanks the presenter and makes some closing announcements, including the topic of the next Café. Finally, the youth leader clean-up crew gets to work.

Our YLTs are open to any high school teen that wishes to volunteer. Each year, we bring the YLT members to a lively leadership meeting shortly before school starts. There they do some bonding, learn (or are reminded) about and volunteer for specific responsibilities, and discuss possible Café topics for the upcoming season. We have found that this meeting sets the tone for the rest of the season.

Monthly meetings with the YLT in each town are useful for planning upcoming Café meetings and in general to keep in touch with the teens. A sense of camaraderie and shared purpose can emerge as well. In our evaluations, the youth leaders have told us that they appreciate having the opportunity to take on responsibilities and learn leadership skills. Like our program, our YLT is informal and youth are motivated to contribute because they like and feel ownership of the program. We keep the rules of membership simple; they are expected to attend the Café meetings, help with whatever needs to be done, and let us know early when they cannot attend.

## **Design Principle 2: Cafés must be highly engaging and interactive; Café programs are not a lecture series.**

### ***Program Formats***

A Café Scientifique brings teens together in an informal setting to learn about science and technology discoveries touching their lives. Teens want active learning, rather than passive listening. To achieve this blend of social learning and engagement, we have structured our programs into two general formats:

- ***Short presentations (15-25 minutes) followed by hands-on learning sessions.***

Examples of Cafés of this type are the following:

- A Café began with an introduction to Google Earth and the art and science of interpreting remote sensed imagery. This was followed by numerous challenges and puzzles the audience had to solve by interpreting imagery from around the world. A final challenge was given for them to determine what was

being built in a remote mountainous village within Iran. The presenter had expertise in monitoring nuclear facilities, and the youth had to try to determine whether this feature might be one.

- Teens learned to discern the age, gender, race, and cause of death from a human skeleton from a 30-minute interactive presentation. Then they worked in teams to identify these characteristics in three human skeletons. Finally, they matched their findings to profiles on a list of twelve crime victims.
- An energy expert taught teens about the engineering and safety challenges of developing hydrogen fuel cell cars; then teens built model fuel cell cars and raced them.
- Teens learned about the challenges of cybersecurity, then engaged in deciphering puzzles in a manner that computer security experts use to search for weaknesses that can be easily exploited in their networks, software, or other systems.
- An introduction to the science of holography and its application was followed by some experiments using filters to create holographic images.
- ***Fully interactive presentations lasting ~40 minutes that are filled with questions and discussion throughout and afterwards.***  
Example topics included:
  - The gritty reality of crime scene investigations was revealed.
  - Exploring in detail the impact of alcohol on the prenatal brain. (This was one of our most popular programs.)
  - A debate and discussion about the potential for a world without nuclear weapons.
  - A debate and discussion about the impacts of genetically modified foods on our food supply and plant diversity.

In our early years, we had monthly themes with two Cafés per month in each town on the same general topic. Topics included a presentation on the societal and scientific challenges of developing a vaccine for HIV, paired with a presentation two weeks later by an HIV positive woman on what it is like to live with the disease. Another pairing examined the basic functions of neurons and cells in the brain and an opportunity to handle human brains. This was followed by a presentation on mental illness and the changes in the brain associated with these conditions.

### ***Venue***

The venue is critical to promoting interactivity. Key requirements for a venue include that it is large enough to comfortably hold the audience (but not too big); has flexible space and furniture; is provided at minimal or no cost; promotes interaction; has good audio-visual capability; and allows us to serve food. We have deliberately avoided holding Cafés in K-12 schools, as it is of great importance to the teens that their Café not feel like school. Finding attractive venues requires simply asking around and following leads.

Teen Café meetings have been held in a wide variety of venues. As our program has grown and changed its format, we have met in small and large museums, local colleges and universities, a large conference room in a research park, a performance amphitheater, a computer classroom, a teen center, and the meeting space of an organization that promotes science, technology, and arts innovations.

### ***Refreshments***

One should not underestimate the importance of food as a draw for teenagers to socialize and engage. Many teens come to our program straight from sports practice, club meetings, or work and have not had dinner. Pizza or sub sandwiches are cheap and easy to come by and are gratefully consumed by the teens. Add some fresh fruit and vegetables as sides and you have a meal. We keep it simple and low cost by buying in bulk and choosing food that is easy to clean up. Venues that required us to buy the food from their on-site food vendor proved prohibitive for our budget. Youth leaders also creatively customize the menus in ways that isn't always possible with a fixed vendor. We have served Jello in the shape of a brain for a Café on how the brain works, hot dogs when learning about the genetic lineage of dogs, and layered pudding with plastic skeletons buried in it for a Café on paleontology of early humans.

### ***Scheduling Cafés to avoid conflicts***

Scheduling around work, church, family, sports, and club schedules is challenging, but in general early evening works best. It is very important to avoid conflicts with the school and community calendar. This is especially important in smaller towns, where *everyone* attends school plays and big sports events, but it can also be a factor in large cities with major events. Café Scientifique New Mexico offers the program in seven months of the school year, starting in September and ending at the beginning of April, with no Café in December due to holidays. We found that by early-April College Board tests, Advanced Placement tests, and State performance tests begin to consume the teen's academic lives, and by May they are too focused on end-of-school-year activities to attend.

## **Design Principle 3: Marketing and relationship building are essential to encourage teens and scientists to participate.**

### ***If you build it, will they come?***

Building a network of schools, colleges and universities, and science and engineering businesses and organizations that support the teen Café program increases the likelihood of success and the potential for sustainability.

### ***Marketing the program to teens***

The signature of adult Cafés is that they attract people from all walks of life. This brings diversity of thought and experience. A teen Café can be designed to attract a diverse group of teens, with or without a strong interest in science, technology, engineering, and mathematics (STEM). Advertising broadly, creating an atmosphere at the Café that is

welcoming of all and selecting topics that engage and intrigue a broad spectrum of teens can achieve this goal.

When planning for a teen program, support of the schools can be instrumental in the success of a program. Holding an information meeting over lunch or breakfast at the schools for the principal and STEM teachers can be crucial in gaining their support in advertising. Some approaches that have worked at the schools include posting flyers in classrooms, messages on school marquee signs, meeting information in daily announcements, and email to teachers, teen participants, and the Parent Teacher organization. Gathering contact information of parents that come to the program makes it possible to send them program announcements.

A teen Café program needs a website and/or Facebook page that contains all the information about the past and upcoming programs. Email, text messaging, and cell phone also are effective means of communicating with the Youth Leaders, especially when there are changes in the program schedule.

Free advertising on public and community radio stations, the community calendar of the local newspapers, and even the community websites of the local television stations is often available. Such ads often reach the parents, who will remind the teens. And in towns with community newspapers, it is even possible to submit short stories about the program for publication.

Sometimes employers of the presenters will highlight the event on their website. An employer may publish an announcement about the program in the daily and weekly news that is distributed to all employees when an employee is presenting. These postings may also reach parents of teens. These articles also raise the profile of the program and presenters, making it easier to recruit future presenters.

### ***Building relationships to recruit and retain youth***

Each year, roughly 25% of a teen program's audience will graduate and move on, so ensuring a steady influx of new teens to the program is critical. Each school year requires renewed efforts to engage freshmen and retain older teens as their interests change and school demands increase. Retention is achieved through regular and frequent communications with the teens, especially the youth leaders. However, it is the experience at the Café itself that makes teens come back again. Make it fun with food, socializing, and active learning. Treat them as young adults, and focus on topics that appeal to them. Youth leadership retention is generally high due to the sense of community they develop. The youth leaders themselves extend a sense of community to their friends and peers, making the Café a welcoming place for all.

Do not expect youth leaders and general participants to attend each Café. Some will be athletes and cannot attend during the season of their sport. Others may have concerts, plays, debates, and other special activities that may conflict on occasion. But even with schedule conflicts, in the New Mexico program we have had youth leaders who stay involved in the planning meetings throughout the year, even if they cannot attend the

regular Café meetings. Long-term commitments of youth leaders, even if sporadic, has increased overall retention and strengthened the program.

Youth are often dependent upon others for transportation or may have restrictions on their driving. Thus, the location chosen for the meetings is a factor in who is able to attend and who isn't. Consider, if possible, providing carpooling incentives to youth drivers to offset the cost of gas when they bring one or more of their friends or siblings. This increases the likelihood of a positive experience and return visit.

### ***Reaching Underserved Audiences***

We sense that one of our secrets to success in reaching underserved audiences is that the program is offered in communities with diverse audiences. Several of them are small communities in which there is a stronger sense of belonging at the Cafés because the teens know many of the others in attendance and know the Youth Leaders. Hosting a Café in a larger city means that you will generally only attract teens that have transportation and live near the venues. To be most effective in reaching the underserved in a large city, the program needs to be held near those populations.

In smaller communities it is easier to spread word of the Café among teens, teachers, and parents, and getting to the program is easier. While a large city has a bigger pool to draw attendees from, the challenges of transportation and competition for teen's time also increases. Understanding and appreciating the cultural and logistical differences is important for connecting with the teens and ensuring they stay with the program.

### **Design Principle 4: Presenters must be carefully vetted and formally trained to communicate effectively with the teen audience.**

The quality of the Café programming offered is the primary determinant of success. The programming is dependent upon choosing a relevant and interesting topic, identifying a skilled presenter (or one who is willing to learn), and developing a presentation and discussion or activity around the topic that is interactive and engaging.

### **Choosing Topics**

If at all possible, begin the process of identifying potential topics and hands-on activities with the teens. They will be eager to tell you what topics they think would be interesting. Making an effort to find presenters for those topics helps to build the teens' sense of ownership. In the Café Scientifique New Mexico program, for example, Cafés on cyberwarfare, brain pathologies, crime scene science, and nanotechnology resulted from teen recommendations.

On the other hand, the teens do not know the universe of interesting science, and you may not be able to find a scientist who is available to present on a particular topic. A great presenter can make an obscure topic come alive, while a poor presenter can make the most interesting topic seem boring. So, we also develop lists of potential topics based on knowledge of high quality presenters and ask the teens for feedback and rankings of

those topic ideas. This dual approach increases the pool of potential topics and presenters, allowing the adult leaders more flexibility in scheduling and recruiting.

In practice in the Café Scientifique New Mexico program, a list of topics is compiled from the recommendations of the individual Youth Leader teams in each of the four towns, and we consult this as we recruit presenters. Commonly a given topic—for example, robotics or the possibility of life on Mars—will receive multiple recommendations, and we naturally place some weight on these.

### ***Recruiting Presenters***

The first step in finding good presenters is to know the qualities that you are looking for. A scientist who knows how to tell a science story in plain language and who understands the importance of the research to society can make any topic interesting. Not many scientists have these qualities *a priori*, so an important element of a Café program is the process of preparing them to present effectively to the teen audience.

Approach contacts in local science and engineering organizations and ask for recommendations on colleagues who are doing some particularly interesting research and have given good talks to public audiences on the subject. The public relations office can often recommend scientists who have been effective in public interviews or outreach to public audiences. Follow up with further inquiries about the presenters that have been recommended to you until multiple trusted sources confirm their abilities.

Contact potential presenters and explore their interest in participating; you will likely find that most scientists are eager to participate. Discuss up front your expectations and provide written guidelines for how to prepare for a Café. If possible, meet with the scientist to discuss their ideas for the Café and provide feedback before confirming their participation. This allows you to work with them to get them thinking about the interests of the teen audience early and to plan for ways to integrate relevant hands-on activities, discussion questions, and such to ensure a highly interactive program.

### ***Preparing Presenters***

There are many approaches to preparing science experts to effectively communicate and engage with public audiences. We provide references to some of these on our website and below. We offer below Café Scientifique New Mexico's process as a possible model for preparing presenters; it is designed for working one-on-one with the presenter to get the program you want.

After setting the dates for a scientist's Café presentations, we provide the presenter with the document "Guidelines for Café Presenters"<sup>3</sup> to help them prepare for a Café. We also set a date for their dry run presentation before a small group of teens.

In the Guidelines document, we encourage presenters to organize their presentation around a single ***Most Important Thing***, a take-away concept that the teens can form a mental image around and discuss. We encourage story telling. If they want to use PowerPoint, we insist that graphics are large, clean, and simple to interpret, the slides are few and jargon-free and contain minimal, if any, words. This reduces the presenter's

likelihood of reading the slides to the audience. In our Café program, we have come to believe that it is *essential* to have presenters do a dry run with a small group of teens. This gets presentations pitched at the right level and the graphics comprehensible. It also helps overcome the intimidation some presenters feel about presenting to a teen audience.

We ask the presenters to write two 1-page documents, one a summary of the science topic as they will present it, the other a very personalized biographic sketch<sup>4</sup>. We provide constructive feedback and editing on the essays. Posting the essays on the Café website in advance of the program can stimulate good questions and interaction during the presentation. The essays are most effective if they both take the form of a *story*, as it helps the presenter think in these terms for the presentation.

In the biographic sketch, the presenter tells his or her own personal story. We stay away from the usual formal—and typically rather sterile—biographic sketch. It is much more engaging to the teens if a picture of the real person emerges—where did they come from, how did they get to where they are, what has grabbed their interest along the way, what has pulled them in and what leaves them cold, what their lives are like in their present research position. We want to get across that a scientist is a real, complex, multidimensional person that lives an interesting life.

#### ***How do scientist-presenters typically feel about their participation?***

You will probably find that presenters report much satisfaction with their participation in a Café program. They typically appreciate learning how to effectively communicate with a public audience. They are also likely to report that the interaction with teens was fun. Many presenters discover that effectively communicating their science through story telling has given them a new perspective on their own research. And they come to appreciate the value of the dry run.

#### ***Time commitment of presenters***

The time commitment of our presenters is significant if they are going to create a memorable and engaging presentation for the teens. There is a significant time commitment on the part of the program staff in recruiting and preparing the presenter and program. To capitalize on this, we offer the program in four towns. Initially, some presenters were apprehensive about giving their time for four programs. However, once they have completed the series of presentations, most all have said that they were glad to have done the program multiple times, as it helped them improve their presentation skills and it made the time spent in developing the presentation more worthwhile.

If you are thinking of developing a Café program for teens, you may want to inquire with other organizations in surrounding regions to see if they would be interested in offering a program. Then, the time and effort required for this component of the program could be shared among the different organizations. If there is an existing adult Café program in the region, you could attend and recruit the best of their presenters.

**Design Principle 5: Each site must have a “local hero” who has the energy and commitment to make the Cafés a success.**

To be successful, these types of programs must be lead by a mature individual who believes in the value of the program and is committed to the positive development of teens. The effort is significant, but the rewards are high. This is a program management function, which for a teen Cafe program includes oversight of presenter recruitment and training, engagement of teens, communication with teachers, parents, and others who will encourage teen participation, liaison with local partners and providers of program venues, publicity, and the myriad details of running an ambitious program.

**Costs**

The main costs are in staff time, venue rental, and food. However, there are ways to keep all of these at a minimum or free.

Staff time is the most difficult to estimate and will depend on whether the organization already has a strong connection to a youth audience, a source of high quality presenters, and knowledge and access to resources that might supplement a presentation with an activity. These are the major variables in the time required. If the organization does not have the above connections and resources, the staff time to build them could be large initially, but then decreases significantly after the first year. The actual time involved in hosting the Café and supporting the YLT activities is on the order of 6-8 hours per Café.

The majority of our venues have waived room rental charges, although in some cases, we have paid for use of computer facilities due to the technical support required. Organizations do this because they see the program as an asset to the organization that supports their scientific or educational mission. We meet in the evenings when the space is in lower demand and always leave the venue clean so the host site has no added costs for cleaning. Food costs run at about \$2-3 per teen, but can be much less if only chips and drinks are served, for example. The more teens that attend, the lower the cost per teen, if you buy in bulk.

Additional costs might include a small honorarium (~\$50) for the presenter, though adult Café programs typically do not offer these. Transportation costs or car pool subsidies could be offered if funds are available. This might add \$30-\$40 per meeting to the cost of a larger Café program.

*This material is based upon work supported by the National Science Foundation under Grant No. (0714762). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.*



## Summary

### **Key Program Elements**

- No-cost, free choice learning takes place in a welcoming and relaxed social atmosphere.
- Relevant and engaging topics and activities stimulate teens' interest and skills in STEM and STEM careers.
- Teen leadership encourages ownership of the program, develops teens' communication skills, and improves program quality.
- Continuous marketing and relationship building are essential to encourage teens and scientists to participate.
- Selection and preparation of presenters is of highest importance.
- Continual evaluation and feedback ensures ongoing program improvement.

### **More Information**

If you would like to learn more about our program or access other materials on how to start your own Teen Café, visit our website (<http://www.cafenm.org>) or contact us directly at: [cafe@scieds.com](mailto:cafe@scieds.com).

### **References**

---

<sup>1</sup> Science Cafés : <http://www.sciencecafes.org>

<sup>2</sup> Foutz, S., and Luke, J., 2010, Café Scientifique Summative Evaluation Report, [http://www.cafenm.org/documents/Cafe\\_Scientifique\\_Summative\\_Report.pdf](http://www.cafenm.org/documents/Cafe_Scientifique_Summative_Report.pdf)

<sup>3</sup> Café Scientifique New Mexico Guidelines for Presenters, [http://www.cafenm.org/documents/Guidelines\\_Presenters.pdf](http://www.cafenm.org/documents/Guidelines_Presenters.pdf)

<sup>4</sup> Meet a Scientist: Biosgraphic sketches of Café Scientifique New Mexico presenters: <http://cafenm.org/scientist.html>

### **Programs Promoting Effective Science Communication**

Presentation Bootcamp: [www.wix.com/rtankers/cosee-boot-camp](http://www.wix.com/rtankers/cosee-boot-camp) and [www.fit.edu/professional-development/.../PresentationBootcamp.pdf](http://www.fit.edu/professional-development/.../PresentationBootcamp.pdf)

Portal to the Public - [www.pacificsciencecenter.org/Portal-to-the-Public/portal](http://www.pacificsciencecenter.org/Portal-to-the-Public/portal)

Storytelling in Teaching -

<http://www.psychologicalscience.org/observer/getArticle.cfm?id=1562>