

Telling Your Story Handbook and Resource Kit

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Introduction

Telling Your Story (TYS) is a five-hour workshop for scientists and teachers developed by TERC (www.terc.edu) for the Center for Ocean Sciences Education Excellence-New England (COSEE-New England, www.cosee-ne.net/) with funding from the National Science Foundation (Grant Number 0215456). TYS provides ideas, approaches, and tools to help scientists share personal stories of their research, their careers, and their institutions with students in K-12 classrooms. The workshop prepares scientists to convey the excitement, importance and context of their work. This handbook has been prepared to help facilitators organize and present a TYS workshop, and then follow up with scientists and teachers to help them form productive partnerships in which scientists visit classrooms to “tell their stories.”*

The TYS workshop embodies an approach to sharing science with students and lay audiences that relies upon telling stories. TYS encourages scientists to share three kinds of stories:

- a story of their own journey to becoming a scientist
- a story that highlights the significance of their research using interesting vignettes
- a story of their workplaces, including the research institution, the lab, the research vessel, field work, and their co-workers.

The goals of the TYS classroom visit are:

- to help students and teachers gain a greater understanding of the ocean
- to inspire the next generation of ocean scientists
- to strengthen student understanding of the scientific process

Between January 2004 and January 2009 more than 100 New England marine scientists and educators attended eight TYS workshops. That experience provides the basis of this handbook for facilitators. The handbook is designed to be used by workshop facilitators and presenters in conjunction with the set of handouts and PowerPoint slides for the workshop. Workshop leaders also should consult the [TYS web site](http://www.cosee-) (www.cosee-

ne.net/edu_project_3/index.php), where they will find testimonials from workshop participants and other recruiting materials.

The workshop and this handbook focus on scientists and K-12 teachers as participants, but the approach is just as valuable for other audiences (e.g., the general public) and educators (e.g., informal educators at museums, zoos, and aquariums). Similarly, TYS was developed for ocean scientists, but can just as fruitfully be applied to share stories of astronomers or engineers.

The handbook is divided into three sections. Part 1 provides a rationale for the “story-telling approach” to sharing science. It points out the benefits to students, teachers, scientists, and research institutions, and how scientist visits to classrooms can help build ocean literacy. Part 2 provides suggestions on advance planning for the workshop. Part 3 describes how to prepare for and conduct the actual workshop.

Part 1

The Rationale for Telling Your Story

Telling Your Story provides benefits for four different groups: students, teachers, scientists, and research institutions. This part of the handbook focuses on answering the questions “Why present a *Telling Your Story* workshop?” and “What is the value of a classroom visit by a scientist?” in terms of the value for each of these four groups.

1. The value for students

Most students grow up having little direct contact with scientists. Few students have scientist role-models in their family or in their neighborhood. In fact, many of them obtain their images of science and scientists from mass media, which, unfortunately, present distorted pictures of science and scientists. For many students, their first face-to-face contact with a scientist occurs during a classroom visit. The visiting scientist thus has a rare opportunity to introduce the world of scientific work, to convey some of the excitement and opportunities intrinsic to the work, and to tell the story of a current research investigation. Perhaps one or more of the students in the audience will be motivated by this visit to maintain an interest in or pursue a career in science.

Students also have little understanding of the nature of scientific work. They have little sense of where research questions come from, how science teams work, and how technology is used in research. They have little appreciation for the long-term nature of many research projects. The idea that one might spend ten years or more studying the same thing is news to them. Students tend to conceive of science as experimental and of scientists as conducting experiments in laboratories using “the scientific method.” Unfortunately, textbooks usually convey little of the process of science; instead, they focus on listing established facts to be learned. Science is presented as “finished” and final, rather than as the continuing active pursuit of knowledge. Although many science teachers understand the dynamic nature of science, they find it difficult to speak with an authentic voice about scientific research. Their mostly second-hand knowledge of research is not fully convincing and engaging for students. However, having a practicing research scientist visit their classroom is an unusual opportunity to learn first-hand how science is actually done, how research questions get selected, and how teams of scientists and support staff are organized to do larger scale investigations.

2. The value for teachers

For teachers, the TYS workshop provides an opportunity to consider science learning from a different point of view and to meet scientists who are eager to visit schools and partner with teachers. Teachers learn how the TYS approach can help their students learn more about the nature of science as it is actually conducted by real scientists and science teams. The workshop includes hands-on activities and practical guidelines, plus time for teachers and scientists to work and strategize together.

Classroom teachers, like their students, have limited personal contact with scientists. Thus, the process of planning and participating in the visit of a scientist to the classroom can give the teacher a valuable professional development experience. The teacher-scientist partnership that develops during the planning phase prior to a classroom visit can potentially have a lasting influence on a teacher. If the partnership endures, it may provide the teacher with a connection to current scientific research and to the research community, and may open up the possibility of participating in the research on a part-time basis. This connection with a practicing scientist may expand and deepen their science teaching.

The experience of working with a scientist may also change the nature of the teacher's science teaching. When the teacher has personal access to a scientist's advice, he or she may begin to incorporate more research data and cutting-edge research into the classroom, may begin to "tell more stories of science," and may give a more accurate picture of real science to students.

3. The value for scientists

Many scientists want to be engaged with K-12 education but do not quite know how to start. Others have taken the leap and visited a classroom to make a presentation, only to be disappointed by the result. TYS is one way for scientists to learn how to prepare for and carry out a meaningful and satisfying visit to a classroom. The scientists who have participated in TYS report that their classroom visits have been not only successful, but also deeply satisfying. Not only do they believe they are making a valuable contribution to pre-college education, they enjoyed the experience immensely! Many scientists are surprised to discover the joy of sharing the excitement of their work with a group of interested teachers and students. Scientists also report that the workshop experience of preparing their stories helped them see their work and its relevance in a new light. As always, the act of "telling" makes the thing communicated clearer to the speaker as well. Here is a sample of comments made by scientists who have participated in TYS.

We talked to the teachers beforehand, as they suggested in Telling Your Story, so we were all on the same page. I did make sure I gave the teachers a chance to have input into what I was going to say. Based on the subjects the various teachers had for their classes, I "spun" the presentation a bit differently.

Professor, University of Connecticut

The Telling Your Story workshop was tremendously helpful. It really laid out the classroom visit: what to talk about and how to introduce myself and my work. Having a structure to follow makes it easier to get started. Teachers came to the workshop, too, so we got a chance to hear what they needed. We had a chance to brainstorm together about ideas in marine seismology and how to put them to work in the middle school curriculum.

Researcher, Woods Hole Oceanographic Institution

I got two big things from Telling Your Story. I met other people who were interested in going into classrooms...[i]t gave me confidence. I have a whole lot more to talk about than I did before. I've put my experience in Telling Your Story into my most recent proposal.

Researcher, Woods Hole Oceanographic Institution

I used the concept mapping exercise. It was useful in terms of thinking about what topics I wanted to hit and how to direct the flow of my talk. The main suggestion from the workshop that I used was to tell people what it is like to be a scientist – that is something that they don't know. It helped direct my talk— to include the science as well as what it is like to be a scientist.

Researcher, Woods Hole Oceanographic Institution

4. The value for institutions

There are also benefits for the research institution where the visiting scientist works. The scientist's collaboration with a teacher, a classroom, or a school can help fulfill the educational outreach expectations of both funders and the home institution. Scientist visits to a classroom can help build public understanding of science by increasing awareness and understanding of science and its value among students, teachers, and parents. A scientist's contribution to the local school builds goodwill and support within the community for the university or research center, and the outreach can also help build local understanding of and support for science and research.

Helping Build Ocean Literacy

In recent years there has been a resurgent interest in and concern for the ocean and the vital role it plays in the Earth system. Reports have been issued that seek to draw attention to the ocean's importance and issues about its health, such as the Pew Oceans Commission report on America's Living Oceans (2003) the Oceans Commission report (United States. Commission on Ocean Policy, 2004) and others.

Scientists who study the ocean and educators who teach about it are concerned that the public has only a superficial understanding of and concern for the ocean. The average teacher and student understands very little about the ocean and even less about ocean research. In many school systems there is almost no teaching about the ocean and most inner-city children and many living in the central portion of the U.S. have never visited the ocean and have never met anyone who studies the ocean. In 2007, the National Geographic Society in cooperation with NOAA, COSEE, the National Marine Sanctuary Foundation, the National Marine Educators Association, and the College of Exploration, published *Ocean Literacy: The Essential Principles of Ocean Sciences K-12*. Participating in *Telling Your Story* and then visiting a classroom to share the story of the ocean is an opportunity for marine scientists to help build ocean literacy.

Part 2

Advance Planning for the TYS Workshop

TYS has been designed as a one-day workshop for marine scientists and teachers to be offered by an institution that desires to promote ocean science literacy. However, we believe the TYS approach can be used just as successfully by scientists, engineers, and technicians in any field. The workshop's success depends on planning, recruitment of teachers and scientists to attend, successful facilitation of the workshop, and following up after the workshop to help scientists and teachers build successful partnerships. It will be most successful if the workshop is conceived as part of a larger program of outreach and support for students, teachers, scientists, schools, and research institutions. Usually the sponsoring institution will be a university or research institution employing marine scientists which believes the workshop will support its institutional goals for outreach and community relations.

A successful TYS workshop will open up new outreach opportunities for scientists, but these opportunities will need to be seized. The potential partnerships with teachers which develop will need nurturing, so it is important that the workshop be conceived not just as a one-time event but as the beginning of a program that will continue to foster teacher-scientist collaboration. *It is extremely valuable for someone at the sponsoring institution to be responsible for making sure that teachers and scientists who meet at the workshop actually do end up working together. It is also helpful if this same person is able to help teachers and scientists find willing collaborators.* Otherwise, scientists who attend the workshop and are eager to visit a classroom may find themselves unable to actually find a willing teacher. Similarly, a teacher who attends the workshop may be unable to find a scientist willing to visit. A coordinator/facilitator at the sponsoring institution will help participants avoid these potential setbacks.

1. Getting a location and a date

You will need a room to accommodate comfortably the participants you invite and, ideally, a separate smaller room for small group meetings of the participating teachers. The beginning part of the workshop is organized as a presentation of information by the workshop leaders, so lecture-style seating will be best. Later, however, it will be valuable for the scientists to have tables at which they can work on their concept maps. At this time, the teachers will go to another room for a separate discussion. Then the teachers and scientists will look at the concept maps together. Here again, tables are useful. You will also need to provide a space for lunch, which may be the same room.

2. The participants: teachers and scientists

Initially, TYS was designed as a workshop only for scientists. Its purpose was to prepare scientists for more successful classroom visits by giving them some fresh ideas on how to present themselves, their work, and their institutions in terms of one or more

narrative stories rather than as lectures. The first several workshops succeeded in changing the approaches of scientists to their classroom visits. The scientists “got it.” But as we began to involve teachers in collaborations with scientists, we realized that many teachers clung to the idea that scientists should teach lessons when they visited. Some of the teachers explained the value of the visit in terms of the scientists being able to impart more advanced content or teach topics in which the teachers themselves felt weak. Inasmuch as our approach advocated scientists telling stories in order to impart the excitement and adventure of science as lived, we realized that we needed to get teachers on the same page or the partnership would not work. If scientists approached the classroom visit prepared to tell stories and the teachers expected a lecture, the whole collaboration would fall apart. Thus, we began to incorporate teachers as participants in the TYS workshops. In the subsequent workshops, teachers have enriched the workshop with their first-hand recounting of the needs of students and the realities of classrooms. They also have consistently understood the TYS message and realized the value of these visits for opening up student possibilities, telling the story of science, and introducing examples of real-life scientific inquiry.

3. Inviting scientists and teachers

The workshop organizers will need to recruit both scientists and teachers for the workshop.

- On the TYS web site we have included a sample letter or email which you may modify to send to scientists, informing them of the workshop opportunity.
- As with most invitations, it helps if it comes from someone they know and respect. Thus, you may want to work through deans, department heads, and research team leaders and ask them to send the invitation. Professors can help recruit graduate students and post-doctoral fellows.
- Be sure to give plenty of advance notice because scientists have busy schedules. Also, be mindful of “seasons” when scientists are more busy than others and when they are likely to be in the field rather than at their home institution.
- Refer scientists to the TYS web site for additional information about the workshop in general where they can read testimonials from former participants.
- Provide the name(s) and contact information for more information about the workshop logistics and content.

Many of the same factors apply when inviting teachers.

- Teachers, too, will respond more favorably to an invitation from someone they know and trust. This may be the education and outreach facilitator of the sponsoring institution or a respected colleague. Consider explaining the program first to a well-known teacher leader and getting them to write a letter of support for the workshop. You can also work through principals, curriculum supervisors, and superintendents. Professional organizations such as local chapters of the National Marine Educators Association (www.marine-ed.org) can be helpful.
- Again, just as with the scientists, refer teachers to the TYS web site for additional information about the workshop in general where they can read testimonials from former participants.

- Provide the name and contact information for more information about the workshop.

You may want to arrange online registration, using a survey tool (e.g. using www.surveymonkey.com or www.constantcontact.com) which will help you gather useful information about registrants, such as dietary needs. No matter how you register participants, try to learn something in advance about their needs and goals for the workshop.

The workshops we have conducted have ranged in size from about 15 participants to 35 or so. This seems to be a manageable number for two presenters. It is important to have a mix of scientists and teachers, with at least one-third teachers if possible.

4. Providing lunch

An important part of the workshop is the lunch break. We recommend you provide a simple catered lunch for your workshop. Our experience has shown that not only will providing lunch help with recruitment, it saves time as people do not need to leave the workshop to find their own lunch. Most importantly, lunch is a time for participants to meet each other, and for teachers and scientists to make contacts that may result in partnerships.

5. Arranging audiovisual equipment

We strongly recommend that you use the PowerPoint slides provided on the TYS web site to structure the workshop, adapting them as needed for your particular audience. For this you will need a computer, projector, and screen. The slides do not include audio so you do not need a sound system beyond amplification for presenters.

6. Directions and parking

Be sure to provide participants with directions to the workshop and instructions for parking. Consider establishing a carpooling option (e.g., with www.GoLoco.org or www.PickupPal.com), and if the site is accessible by public transportation, provide that information as well.

Part 3

Preparing for and Conducting the TYS Workshop

We have found that the workshop is best presented by a pair of facilitators. On the TYS web site we have provided all the materials needed to offer the workshop, including a set of PowerPoint slides and handouts. Materials to be printed for the participants, such as the agenda, the handouts, and the evaluation forms, are provided as Microsoft Word files so that you can customize them with information for your particular workshop. You can also customize the PowerPoint slides, adding information about your venue and the sponsoring institution and substituting images of your own for those included in the slides.

We have included an annotated agenda below which briefly describes the purpose of each segment of the workshop. Begin your preparation by quickly reviewing this version of the agenda. Then refer to the detailed notes on the workshop, below. Print out a set of the handouts to refer to and open the PowerPoint presentation. Go through it slide by slide as you follow the sequence of presentations in the detailed agenda. In each section of the agenda, take a look at the handouts for the participants. In this way, you will develop a sense of the “flow” of the workshop and will be able to imagine how everything works together. Even though the detailed notes on the agenda constitute a kind of “script” for the workshop, you will need to speak in your own words about each of the major ideas.

Telling Your Story Workshop

How to Make the Most of a Classroom Visit

Annotated Agenda

- 10:00-10:30 Welcome, Introductions, and Overview
- During this half hour, the workshop leader introduces the other members of the workshop team and the workshop hosts. Participants are asked briefly to introduce themselves. Begin the accompanying PowerPoint presentation and give an overview of the workshop—its purpose and goals—and review the agenda for the day.*
- 10:30-11:00 Why should a scientist visit a classroom? Benefits for students, teachers, scientists, and institutions.
- The purpose of this half hour is to begin the discussion of the benefits that can accrue to students, teachers, scientists, schools, and scientific institutions as a result of a classroom visit by a scientist. See the accompanying PowerPoint presentation.*
- 11:00-11:30 Before Becoming a “Visiting Scientist”
- Homework for Scientists: Preparing Your Three Stories
- A. My Story of Becoming a Scientist
 - B. Where I Work
 - C. The Story of My Research
- This half hour lays out the basic approach of TYS. See the accompanying PowerPoint presentation.*
- 11:30 – 11:45 Developing Three Stories Using a Concept Map
- This segment describes how concept mapping can be used by scientists to begin developing the stories they can tell. See the accompanying PowerPoint presentation.*
- 11:45-12:30 Lunch
- Encourage scientists and teachers to meet each other during lunch, exchange contact information, and explore possibilities for working together.*

12:30 – 1:15	<p>Scientist Meeting: Developing a Concept Map—work in pairs or small groups</p> <p><i>Scientists work in one room in pairs or in small groups to develop a paper and pencil concept map of their research, their career, and their institution.</i></p> <p>Teacher Meeting: Responses to TYS and Being a School Ambassador</p> <p><i>Teachers meet in another room and discuss their responses to the TYS approach with one of the workshop leaders.</i></p>
1:15- 1:45	<p>Developing Stories from Concept Maps—teachers and scientists in small groups</p> <p><i>Teachers and scientists work together in small groups of 2, 3, or 4 to discuss the concept maps that scientists have created. Teachers provide feedback to the scientists on the maps and point out areas of the map that would be particularly interesting to their students, topics that relate well to the curriculum being studied, and areas where the scientist may need to expand the map.</i></p>
1:45 – 2:00	<p>Pre-Visit Planning</p> <p><i>This segment emphasizes the importance of pre-visit communication between the teacher and the scientist, and provides an overview of how teachers and scientists can plan for an effective visit. See the accompanying PowerPoint presentation.</i></p>
2:00 – 2:10	<p>Break</p>
2:10 – 2:20	<p>Being Effective in the Classroom</p> <p><i>This segment offers tips to scientists on how to be effective in the classroom. See the accompanying PowerPoint presentation.</i></p>
2:20 – 2:30	<p>Resources to Support Classroom Visits</p> <p><i>This segment describes how workshop leaders, facilitators, hosts and other staff are available to support teachers and scientists as they arrange classroom visits. See the accompanying PowerPoint presentation.</i></p>
2:30 – 2:40	<p>Following Up After the Visit</p>

Presenters discuss the importance of following up after the visit to the classroom. See the accompanying PowerPoint presentation.

2:40 - 2:45 Final Remarks, Comments, and Questions

2:45 - 3:00 Written Evaluation

Participants complete a written evaluation of the workshop. See the three forms of the evaluation document provided as part of the workshop materials.

Detailed Notes on the TYS Workshop Agenda and Slide Presentation

Welcome, Introductions, and Overview of the Workshop—30 minutes

Slides 1 through 4

Normally, a representative of the sponsoring organization will welcome the participants and introduce the workshop presenters. The host will mention any logistical information that the participants need to know, such as parking validation, lunch, and restroom locations.

Following this welcome and introduction, one of the workshop presenters will also welcome the participants and thank them for coming. The presenter will introduce any other members of the workshop team and staff. Then the presenter should give an overview of the workshop day. Going through the agenda is a convenient way to do this. Each participant should have a copy of the agenda (included on the TYS website) to follow along.

The presenter then can use slides 3 and 4 entitled “Overview of TYS” and “Goals for the Workshop” to present the TYS approach and goals.

Finishing up this segment, it is a good idea for the participants to get to know each other a bit by briefly introducing themselves. Emphasize that the introductions should only include name, job, and institutional affiliation. Teachers can give their grade level and subject matter and scientists can mention their field of study. If you allow long introductions you will exceed the time allotted for this part of the workshop. You will gain a lot of appreciation from the participants if you stay on schedule!

Why Visit a Classroom?— 30 minutes

Slides 5 through 17

In this section, you want to develop the motivation for scientists and teachers to collaborate to plan a classroom visit by the scientist. Slides 5 through 17 are organized to present the value of a classroom visit for each of the four major groups that will benefit from such a visit: students, teachers, scientists, and institutions. The slides will help you cover the main areas of value. Review Part 1 of the handbook, where these benefits are discussed in more detail. If you have scientists and teachers you can call on to render personal testimony about the benefits, you should certainly do so. Teachers who have had scientist visits can recall the excitement and interest of the students and what the visit meant to them. Scientists can recount their own satisfaction with the visit and reflect on any ways that it may have caused them to think differently about their subject matter. If possible, invite a scientist and teacher who have collaborated on a visit to share their experiences together. The overall goal of this section is simply to provide a wealth of reasons why a visit is a good idea! Some of these ideas may end up being

used either by teachers or by scientists to justify the value of a visit to an administrative superior.

Before Becoming a “Visiting Scientist”— 30 minutes

Slides 18 through 28

This half hour lays out the basic approach of TYS. Using the PowerPoint slides (ppt) as a prompt, you help the scientists begin to think of their visit in terms of telling one or more of the three stories—their personal story, the story of their science, and the story of the institution where they work.

Your Personal Story

Slides 21 through 24

To help scientists develop their personal story, encourage them to think back to when they were the age of the students in their audience. What were their interests then? Perhaps not science! For some scientists, their interest in science emerged early. For others, however, this did not happen until later in their life. Point out to the participants that it is interesting and worthwhile for students to know about this. The ppt includes other “prompt” questions that may help scientists begin to craft the story of their career.

The Story of Your Workplace

Slide 25

The second story which scientists might tell concerns where they work, the institution that supports them in their research. Scientists may not initially think that students would care about their working environment, but in fact they do. Remind the audience that students have little information about the conditions under which science is carried out. They tend to think that all scientists work at benches in laboratories wearing white coats. Thus, it is broadening for a visiting scientist to show photos of him/herself and colleagues at work, especially if it involves working outdoors. Marine scientists may be able to show photos of themselves or colleagues on ships, using elaborate equipment or braving the elements. Kids are interested if there is a bit of adventure! In fact, there may be a nice set of slides describing the work of the institution. And don’t forget to show on a map where the institution is.

The Story of Your Research

Slides 26 through 28

The third story that scientists can tell in the classroom is the story of their research. This story can be extremely interesting to students, but must be couched in language and at a level of sophistication that is appropriate for the age of the students. Here, of course, the teacher can be of great help to the scientist in developing this story. The teacher is an expert in the developmental level of the students and knows what will interest them and what is over their heads.

The PowerPoint slides contain a number of questions that are designed to help prompt the scientist to think of various aspects of this story. Scientists will have to weave those pieces into a whole. One way to do this is to recount interesting vignettes from an actual research expedition or experiment that has been carried out by the scientist. Remind scientists that it is important to help students understand that many research questions involve teams of people (and not just scientists) working over long periods of time.

The research story is also an opportunity for scientists to emphasize the things they still don't know and the difficulty, sometimes, of living with uncertainty. The data are not always complete and theories may be based on partial data. This is a chance for a scientist to explain what a theory is and how it helps them conduct research, emphasizing that scientists mean something very specific by a theory. The prompt "Who checks your work?" is meant to be an opportunity to discuss the peer review process and to contrast it with school work, in which the teacher usually checks a student's work. Once out of school, scientists rely on peers to check their work.

Scientists will get more opportunity to develop their stories in the concept mapping exercises that follow.

Developing Your Three Stories Using a Concept Map —15 minutes

Slides 29 through 31

The purpose of this brief segment is to introduce the idea of a concept map and to show an example of one. Refer to the related handout: "Developing a Concept Map."

Refer to the handout "Developing a Concept Map" for your main talking points. Bear in mind that scientists may be completely unfamiliar with a concept map as a visual organizer. Emphasize that the concept map is a kind of brainstorming tool and that there is no "right or wrong" way to do one. The point of this concept map is to get scientists to think about the three stories they have to tell and to have a way to organize that thinking.

The ihmc web site (<http://cmap.ihmc.us/conceptmap.html>) provides information on the use of concept maps and allows a free download of the CMAP concept mapping tool. Inspiration Software, Inc. (<http://www.inspiration.com/>) provides a commercial concept mapping program.

Point out the major aspects of the example concept map. Discuss how each of the stories is developed in terms of questions. Explain that after lunch scientists will spend time developing a concept map for a topic of interest to them and that then they will have a chance to discuss the map with a teacher. During that discussion the teacher will provide feedback on aspects of the map that are likely to be of interest to his or her students.

Lunch—45 minutes

Encourage scientists and teachers to meet each other during lunch, exchange contact information, and explore possibilities of working together. This is a unique and valuable opportunity.

Scientist Meeting: Developing a Concept Map—45 minutes

During this part of the workshop, scientists and teachers meet in separate rooms. (One presenter works with each group.) Give scientists large sheets of paper (flip chart sheets work well) on which to develop their concept maps. Circulate among them to offer help and answer questions. Encourage the scientists to refer to the concept map example and to do a certain amount of “free association.” Emphasize that there is no right or wrong way to do these maps; they are tools for thinking visual organizers.

Let scientists know that when teachers return each scientist will be sitting down with a teacher to discuss their concept map and that the teacher will be asking them to clarify and elaborate ideas they have written down. The teachers will be indicating areas where students will have greater and lesser interest and pointing out parts of the topic that might be emphasized more or less.

Teacher Meeting: Responses to TYS & Being a School Ambassador—45 minutes

Teachers meet in a separate room with a facilitator (usually one of the presenters) to discuss their responses to what they have learned so far, and to share their thoughts about acting as an ambassador for the TYS approach in their school and district. They should be encouraged to air any doubts they have about the value or practicality of TYS and to share concerns about challenges as well as hopes for its value. The purpose of this discussion is to allow teachers to share any concerns they may have about implementing the TYS program in their school and to allow the facilitator to address these concerns with the group. Here are some questions you might use to get discussion started:

1. What do you think of the approach to a scientist visit that we have been describing?
2. What do you think might be the value of the TYS approach for your students?
3. What challenges, if any, do you see in helping other teachers adopt this approach in your school?
4. What would you hope students would get out of this approach?
5. Have you had experience with scientists in your classroom before? If so, how does that experience compare to what you might now expect from a scientist visit following the TYS model?

Conclude the discussion after 40 minutes to allow time to prepare them for their role when they return to the main room. Explain that they will be sitting down with one or more scientists to review the concept maps that the scientists have been working on. Their role is to ask questions about the map, both from their own point of view and that of their students, and to help the scientists think about which parts of the stories laid out on the map would be interesting and appropriate for the students.

Developing Stories from Concept Maps—30 minutes

During this half hour, teachers and scientists work together in small groups of 2, 3, or 4 to discuss the concept maps that scientists have created. Teachers provide feedback to the scientists on the maps and point out areas of the map that would be particularly interesting to their students, topics that relate well to the curriculum being studied, and areas where the scientist may need to expand the map. Encourage teachers to provide candid feedback on the interest level that students may have in what the scientist has outlined.

Near the end of the 30 minutes, draw everyone together for a whole-group discussion. Ask scientists and teachers to comment on how these conversations went and what they learned from them.

Pre-Visit Planning—15 minutes

Here we transition into the actual mechanics of working with a teacher and planning a specific classroom visit.

Refer to the handout “Classroom Visit Planning Sheet.” Begin by re-emphasizing how important it is for the scientist and teacher to work together to plan the visit. Explain that this sheet is designed to facilitate that process and that it can be filled out by either scientist or teacher. Its purpose is to make sure the visit goes smoothly and that scientist and teacher are “on the same page” about the purpose and character of the visit. Go through the part of the sheet labeled “Planning the Stories” item by item. Explain that the concept map can be used in a pre-visit consultation to narrow and focus the stories. The teacher and scientist should agree on the goals of the visit (item 2). Items 3 and 4 give teachers an opportunity to share with the scientist valuable information about the students’ pre-existing knowledge, questions, and possible misconceptions. This information can inform the scientist’s planning. Item 5 simply reiterates what should be the respective responsibilities of scientist and teacher. Especially important is the notion that the teacher should plan to interrupt with a question of her own when she feels that the students have not understood a particular point and that the teacher should always remain in the room to supervise the students. The scientist should not be expected to be responsible for regulating students’ behavior.

Being Effective in the Classroom—20 minutes

Slides 32 to 43

Refer to the ppt, where the points are self-explanatory. Simply review them and rehearse what you will say to amplify and emphasize them.

Following Up After the Visit—10 minutes

Slides 44 and 45

Refer to the PPT slides. Go over the main points in the slides. Explain that it helps for the scientist to leave behind some tangible memory of the visit, such as a handout, an artifact such as a seashell, a data sheet, a map, or some information about his or her institution. The scientist should provide ways for students and the teacher to make contact after the visit by regular mail, email, and/or phone as appropriate. This will allow students to send hand-written thank you notes if they wish. The scientist should emphasize a willingness to answer further questions and to keep up the relationship with the teacher and the students.

Refer to the “Follow-Up Tips for Scientists” and “Follow-Up Tips for Teachers” handouts. Emphasize to scientists that they want constructive feedback from teachers about the visit but that they are unlikely to get anything but praise and appreciation unless they pointedly ask for feedback on the visit’s effectiveness. The “tips for scientists” sheet includes several questions that will help obtain realistic and candid feedback that can help improve the next visit. Encourage teacher-participants to share their ideas as well.

Resources to Support Classroom Visits—10 minutes

Slide 46

Refer to the “Web Resources” handout. Point out that these resources may be useful to scientists and teachers as they plan a classroom visit. These resources have been prepared for the New England region, but please modify them as you see fit for your particular audience of participants. Also provide contact information for any facilitators and outreach staff who are available to help scientists and teachers contact each other and plan a successful visit. *It is important to have such a person identified before the workshop so that their contact information can be included.*

Final Remarks, Comments, and Questions—5 minutes

Slides 47 and 48

Use this time to respond to questions and comments, to thank the participants for coming, and to sum up the day.

Written Evaluations—15 minutes

Use this time for the participants to fill out the written evaluations provided. It is important to ask participants to evaluate the workshop to gauge its success and to obtain information that will help improve the next one. We have provided three different evaluation forms as Microsoft Word documents so that you can modify them for your own use. There is one form for scientists, another for teachers, and a third for informal educators and facilitators. Prepare enough printed copies and hand them out at the end of the workshop for participants to fill out before they leave. Experience shows that this is the best time to obtain feedback; if participants take them home with a promise to return them, some will not be returned despite the best of intentions. For this reason, the workshop schedule allows time for participants to complete the evaluation onsite.

Final Thoughts: Sustaining teacher-scientist collaborations

It is important for the facilitator/broker to stay in touch with the scientists and teachers after the conclusion of the workshop. Although many scientists and teachers may have made contact with each other at the workshop itself and may have made plans to begin to work together, the facilitator/broker can make sure these plans come to fruition. After participants leave the workshop, “real life” once again closes in and people become very busy. The best of intentions may go unfulfilled. Here the broker can play an important role by staying in touch with the participants and helping them carry out the plans they have made. Other participants may leave the workshop without having found a partner, and the broker can help them make contact with a partner if they wish.

Although some facilitator/brokers may wish to set up databases that participants can use to learn about the availability of potential partners, often the simplest and best solution is for the broker to be simply that, a go-between who links up willing teachers with willing scientists. An email list that the broker uses to send periodic announcements can accomplish a lot. The facilitator can invite both scientists and teachers to contact her with requests and needs. Then these requests can be re-broadcast to the entire list. The personal touch is often best.

References

National Geographic Society (2007). Ocean Literacy: The Essential Principles of Ocean Sciences, K-12.

(www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf)

Pew Oceans Commission (2003). America’s Living Oceans: Charting a Course for Sea Change. A Report to the Nation.

(www.pewtrusts.org/our_work_report_detail.aspx?id=30009)

United States Commission on Ocean Policy. (2004). An Ocean Blueprint for the 21st Century.

(http://oceancommission.gov/documents/full_color_rpt/welcome.html)

List of workshop handouts

1. Sample e-mail to scientists
2. TYS sample agenda
3. Developing Three Stories Using a Concept Map
4. Developing Three Stories Using a Concept Map (example, in color)
5. Classroom visit planning sheet
6. Follow-up tips for scientists
7. Follow-up tips for teachers
8. Web resources for teachers and scientists

9. Scientist survey
10. Teacher/ school administrator survey
11. Informal educator survey