

Writing Papers in the Biological Sciences

Fourth Edition

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CHAPTER 10

Other Forms of Biological Writing

ORAL PRESENTATIONS

Many biologists participate in professional conferences or symposia that offer a forum for exchanging ideas, conveying information about new research methods, and reporting research in progress. Conference proceedings are often available in printed form; however, oral exchange of information is still an important means of communication.

As a biology student, you may be required to prepare an oral presentation of your own—perhaps a summary of a published paper, a review of the literature on a particular topic, or even a report of your own research for a seminar or a professional conference. Although the final product will not be presented in written form, you will still need to use writing to organize your talk. Actually, there are many similarities between writing a paper and planning an oral presentation. Both activities require you to understand your audience and your purpose and to convey information clearly, accurately, and logically. Both also force you to examine your own understanding of the material and to use writing as a means of clarifying your thoughts.

Following are some practical suggestions for giving successful oral presentations.

■ **Consider your audience.**

Tailor your presentation to your *listeners*. Consider their experiences, interests, and background knowledge in the context of your own rhetorical aims. For example, you would pitch your talk differently to a

nonscientific audience than to a scientific one. For a lay audience, you might choose a different title, use fewer technical terms, cover the material in less depth, omit certain aspects of your topic, even take a completely different slant. Also, of course, audiences have different expectations depending on the purpose of your talk in the first place. A course instructor will expect you to demonstrate sound knowledge of your subject and the ability to handle questions from the rest of the class. Conference participants will be interested in the quality of your research, as well as its implications for their own work.

■ Use an appropriate method of organization.

How you organize the presentation will depend, of course, on the subject, your audience, and your objectives. Nevertheless, planning will be easier if you think of the talk as having a distinct beginning, middle, and end. A logical way to start is with general background material; then narrow down to the specific focus of your talk. Be sure to keep introductory material brief, or else you'll have to rush through the most important points. Save time at the end to summarize, offer conclusions, discuss broader aspects of the topic, and answer questions.

If you are reporting original research, use the format of a research paper (see Chapter 4) to guide you. Begin by briefly summarizing the general topic or scientific issue, placing your own study in context. Then get specific: Why did you do this study? What did you expect to find? Briefly explain your materials and methods. Next, in the middle (and longest) section of your presentation, summarize the results. Here, focus on your major findings, adding just enough supporting information (details, statistics, examples) to develop your points. Conclude by looking again at your objectives. Do the data support your original hypothesis? What connections can you make to the findings of other researchers? What questions remain? It may also be appropriate to acknowledge specific people who have helped you with the research, as well as any sources of funding. Some speakers do so at the beginning of their talk, others at the end.

■ Write out the entire talk beforehand.

Even if you are an accomplished speaker, putting everything down in writing will make your presentation more organized and coherent and will lessen the chance that you'll forget an important point. Plotting out the talk sentence by sentence also allows you to plan your words carefully and search for the most effective ways of explaining difficult ideas. After you rough out the first draft, revise the manuscript carefully, looking for sections that are poorly worded or likely to confuse the audience or that jump abruptly from one topic to another.

■ Never read a prepared talk word for word.

Doing so will suggest (perhaps correctly) that you are not comfortable enough with the material to abandon your notes. It will also distance you from your listeners, who will rapidly lose interest in your formal recitation. Instead, use the written version of the talk to make a brief list of key points or concepts; these can be put on a single sheet of paper or on file cards arranged sequentially. As you speak, use the key points to jog your memory and keep you on track. Once you become thoroughly familiar with the talk in its written form, you will probably remember your most effective sentences and phrases word for word and will be able to say these naturally as if they just occurred to you. An effective talk—one that really engages the audience—strikes the proper balance between carefully structured wording, worked out in advance, and a spontaneous, informal delivery.

■ Observe your time limit.

Presentations at professional conferences are subject to strict time constraints: if you run out of time, you may have to stop abruptly even if you're only midway through your talk. Even student presentations must take into account the instructor's plans, the needs of other speakers, and the duration of the class period. Beginning speakers often devote too much time to introductory material or their first few points and then run out of time at the end. Time your presentation carefully, either by running through it mentally or (preferably) rehearsing it out loud. Decide what you should be discussing halfway through the allotted time period, and note this point both on the final draft of the talk and on your speaking notes. Running over time is not only a sign of poor preparation but also a discourtesy to others. The same applies to starting late.

■ Do not speak too rapidly.

If you are nervous you may speak more quickly than usual, especially as you approach the end of the talk. Remember that listeners need time to digest everything they hear. If you confuse them at any point, they may stay confused for the rest of the talk; unlike readers of written text, they cannot go back and review difficult sentences. It helps to pause briefly after important points and to repeat difficult material in slightly different wording. If your format permits, you can also invite questions at potentially confusing places in the presentation.

■ Do not swamp listeners with details; avoid jargon.

Develop only a few main points. Even highly attentive listeners can take in only so much information at one time; they'll lose track of your argument if you bombard them with too many details. Use clear,

straightforward language and avoid jargon. (For more on writing clear, accurate sentences, see Chapter 7, pp. 178–187.) Explain any terms likely to be unfamiliar to listeners, but keep the number of such terms to a minimum.

■ Establish eye contact with the audience.

Doing so will make you more relaxed and your audience more receptive. Addressing your listeners directly also encourages you to speak up, not mumble as you gaze at the floor. Your voice needs to be loud enough to capture everyone's attention, even those in the back row.

■ Use visual aids.

PowerPoint

PowerPoint (Microsoft Corp.) is a versatile software package that allows you to mix text with graphs, tables, photographs, or videos, including animation. With PowerPoint you can prepare separate slides, shown via a computer projection system, that lead your audience through your presentation from start to finish. The basics of PowerPoint are easy to master; however, don't let the technology overshadow the content of your talk. Even if you have mastered all the bells and whistles, if you have little to say, your presentation will still fall flat. In fact, overuse of every feature and gimmick may distract, even irritate, your listeners. Following are some guidelines advocated by many PowerPoint users.

Each slide should focus on a single topic. Don't use more text than your audience can take in at a glance—a general rule of thumb is to use a maximum of 5–6 lines per slide and no more than 5–6 words per line. Try not to break words at the end of a line. Align type on the left, but not on the right, and use sans serif fonts, such as Arial or Verdana, for more readable text and graphics. Some speakers prefer serif fonts for titles. Avoid using all capitals, even in titles, since such text is difficult to read. Proofread all text meticulously for misspelled words and typos, which will be embarrassing later when they are projected on a big screen.

Remember that some people will be looking at your slides from the back of the room, perhaps a large room, so your type size should take this into account. Use type of at least 36 points for titles and at least 24 points for the text. If necessary, you can add different colors, as well as italic or bold, for emphasis, but use these devices sparingly and consistently.

Bullets can be effective in setting off related points in a list. For consistency, use parallel grammatical construction for all the bullets on a slide. For example, if three of your bulleted points are sentence fragments beginning with *-ing* forms of verbs, then your fourth point shouldn't be a full sentence beginning with a noun. Punctuation is not necessary at the end of a bulleted point.

Bear in mind the importance of contrast in creating readable slides. For instance, you might use light letters on a dark blue background. For an integrated effect, keep the same background color from slide to slide, and don't overuse color (or any other attention-getting device).

Do not simply read your text slides back to the audience word for word or you will lose your credibility—and your listeners. The audience still expects you to give a coherent talk in your own words. Your slides should highlight your main points, not substitute for your presence.

Slides depicting numerical data should be simple enough for the audience to grasp quickly. Do not pack them with more information than people can absorb in a minute or two. Axes of graphs should be clearly labeled and, as with text, all words and numbers should be large enough to be seen from the back of the room. Remember that slides showing data should stress concepts, not particulars. Use them carefully and sparingly to make your points.

For original research, you may wish to incorporate digital photographs illustrating the field site, organisms studied, experimental apparatus, etc. These pictures must be sharply focused and well composed or else they are not worth using. Do not make the common mistake, seen even at professional meetings, of showing blurry, cluttered, or otherwise unsuitable photographs accompanied by weak apologies (“This picture isn't that clear, but . . .”). If you are not a competent photographer, ask someone for help, or think of an alternative method to convey the same information. Clip art can be useful in PowerPoint presentations, but only if used sparingly or else it will distract from your content.

You may wish to bring along supplementary handouts—additional references perhaps, a more detailed account of your methods, or reprints of an earlier study. These can be made available later to anyone who is interested.

SAMPLE POWERPOINT PRESENTATION

Following are slides for a PowerPoint presentation of the student research project in Chapter 4 (pp. 102–113). Notice how the speaker has focused on the most important aspects of the study, using slides to highlight these points rather than simply present a condensed version of the paper.

Other visual aids

Many speakers still rely on 35mm transparencies to illustrate their talks. For a conventional slide presentation, most of the same guidelines for PowerPoint still apply. Transparencies should be sharp, uncluttered, and well-exposed; otherwise, don't use them at all. Decide beforehand exactly what you will say about each slide, and omit any slides that serve no clear

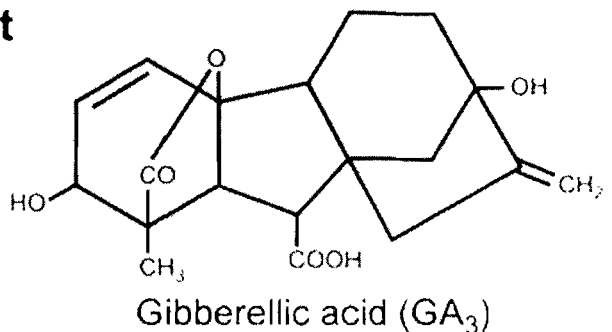
Germination of *Arabidopsis thaliana* in Response to Gibberellins in Light and Darkness

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Slide 1

Gibberellins and Seed Germination

- Break seed dormancy
- Stimulate germination
- Promote embryo development



Slide 2

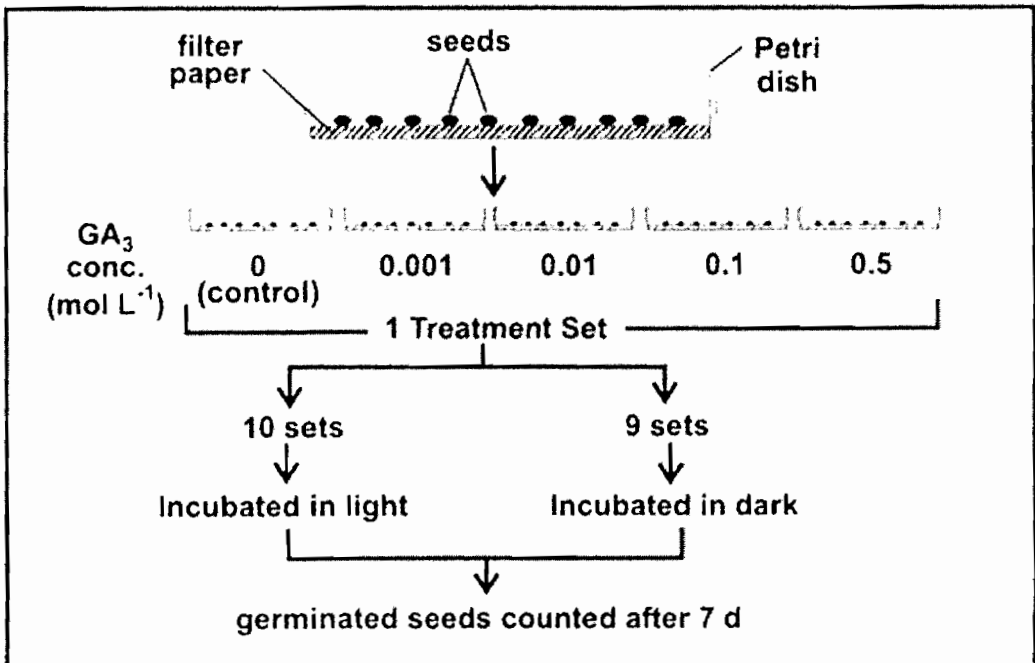
Study species

- *gal-3* mutant of *Arabidopsis thaliana*
- Germination depends on exogenous GA's

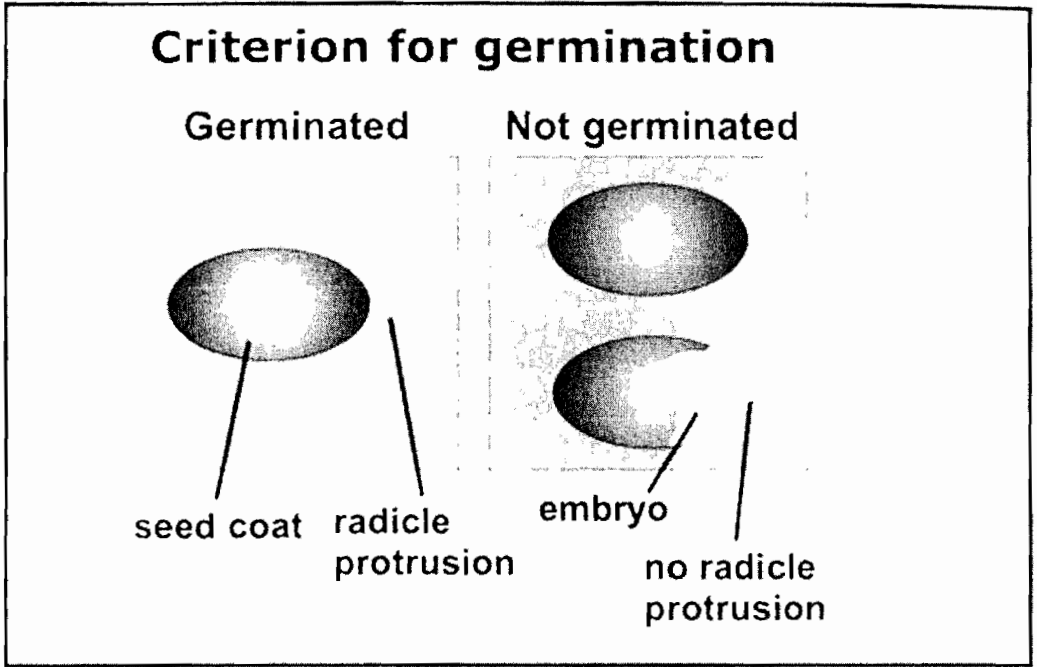
Questions

- How does GA₃ concentration affect germination?
- Are effects of GA₃ different in light vs. darkness?

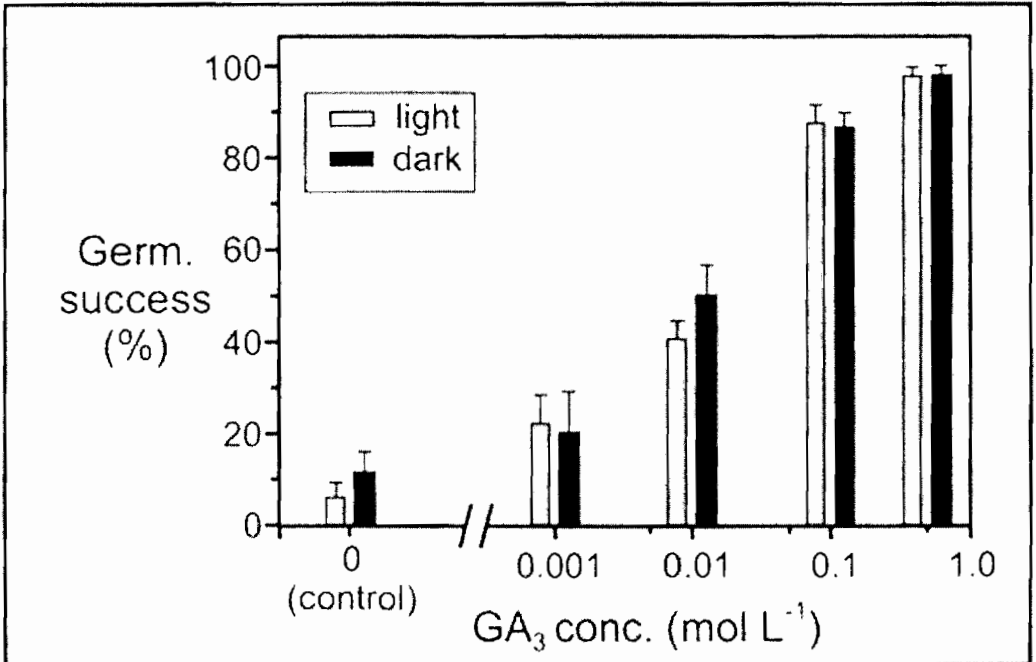
Slide 3



Slide 4



Slide 5



Slide 6

Two-way ANOVA: GA₃ conc. and light/dark conditions

Source of variation	<i>F</i>
GA ₃ conc.	105.96 ^{***}
Light/Dark	0.41 ^{ns}
GA ₃ conc. x Light/Dark	0.48 ^{ns}

*** = $P < 0.001$; ns = nonsignificant ($P \geq 0.05$)

Slide 7

Conclusions

- Germination success increased with increasing GA₃ concentration in both light and darkness
- At all GA₃ concentrations, germination success did not differ in light vs. darkness

Slide 8

purpose. Write down in your lecture notes when each slide should be shown. Budget your time carefully to take into account how much time you will devote to each slide. When possible, try to show slides in one or more groups; otherwise, you will distract the audience by repeatedly turning the lights on and off. Set up the projector and screen in advance, locate a pointer, and check that all slides are loaded correctly and in the proper order.

Overhead transparencies are also effective lecture illustrations. You can use blank transparency sheets to jot down terms or make quick drawings as you talk. Even better, you can prepare transparencies of bulleted lists, graphs, tables, etc., in advance. Again, keep these simple, concise, and easy to read. An advantage of overhead projection is that it allows the speaker to leave the room lights on and thus to interact more directly with the audience.

Finally, for classroom presentations, the blackboard is a traditional and still invaluable tool. Use it as you talk to write down unfamiliar terms or important statistics or to make very simple drawings or graphs. Your writing should be large enough to be seen clearly from the back of the room. Usually printing is easier to read than script. Graphs should be clearly labeled and easy to grasp quickly. Do not clutter the board with disorganized scrawls, and do not inadvertently erase information you must refer to frequently.

Material that is relatively time-consuming to draw should be put on the blackboard *before* your talk; otherwise you'll waste time writing while listeners wait impatiently or struggle to copy what you have written. Consider, instead, putting such material in a handout that the audience can look at as you talk. Handouts are also useful for listing key terms and definitions, important points to be covered, or useful references. However, don't simply read your handouts aloud to your audience, and don't make them too detailed; otherwise, people will spend their time reading instead of listening to you.

■ Rehearse your presentation in advance.

If possible, find several caring people who will listen carefully to your talk and give constructive criticism. Ideally, these should be people whose background and interests are similar to those of your "real" audience. Make this practice session a full rehearsal, complete with slides, overhead transparencies, etc. If possible, rehearse in the room in which you'll actually be speaking or in one of similar size and layout. Have at least one person sit at the very back of the room. Are you talking loudly enough? Are you speaking clearly, neither too fast nor too slowly, and with enough energy so as not to be tedious to your listeners? Are all slides or transparencies readable? Also ask one of your listeners to time your talk from start to finish, allowing a few minutes for questions and answers at the end. Rehearsing in

front of a live audience will not only allow you to fine-tune your whole presentation, but it may also help you feel more confident later.

■ **Be prepared for questions.**

You cannot predict everything you will be asked, but you probably can anticipate some of the questions. Write them out beforehand and prepare brief, concise answers. It often helps to repeat or rephrase each question before you answer it, since some people may not speak loudly or clearly enough for others to hear. Doing so will also give you a little extra time to compose your response.

If you are asked a question for which you are unprepared, do not try to bluff your way through a reply. It is far better to say that you don't know the answer. If you have given a thoughtful, well-organized talk, listeners will already be convinced that you know your subject. They will not expect you to know everything.

■ **Check out the facilities and equipment in advance.**

Regardless of what kinds of visual aids you plan to use, be sure to double-check the facilities, especially if you will be speaking in an unfamiliar setting. Many conference rooms have blackboards and overhead projectors, for example, but some do not. Pointers and microphones may or may not be part of the standard equipment, and important light switches may not be located in obvious places. If you plan to use PowerPoint for a conference presentation, you may need to follow specific guidelines about submitting your material. Even for a talk at your own institution, it is vital to check out the computer projection system you will be using. As additional insurance, prepare overhead transparencies as a backup to use if you run into technical problems.

In summary, it is wise to arrive early and check the setup well in advance. Doing so will help you feel more comfortable and help you focus on the most important part of your talk: what you actually want to say.

■ **Checklist for oral presentations**

- Are you sure of your own objectives as speaker?
- Do you understand the expectations and background of your audience?
- Have you prepared a written version of your talk? Do you have a clear organizational plan, with a beginning, a middle, and an end?
- Have you emphasized main points and trends? Do you save time for a summary and conclusions?
- Do you have brief lecture notes to consult if needed?

- Have you prepared high-quality visual aids (e.g., PowerPoint, 35-mm slides, overhead transparencies) to illustrate and emphasize your points?
- Have you checked out the room and equipment in advance?
- Do you have backup materials in the event of technical problems?
- Are you prepared to speak spontaneously, without reading your notes (or your overheads or slides)?
- Have you rehearsed your talk before a live audience?
- Is the length of your presentation within the time limits?
- Are you prepared for questions?

POSTER PRESENTATIONS

A poster presentation conveys an author's original, unpublished findings *visually* through a selective assemblage of illustrations (graphs, tables, drawings, photographs, etc.) that are carefully integrated with a small amount of text. Thus, an entire study can be summarized visually. Posters have become popular forms of communication at scientific conferences, and considerable space may be set aside for them. Usually, there are designated time periods for the authors to be present to answer questions. Some people prefer giving posters to delivering talks because they feel more comfortable with the format; in other cases, a particular study may lend itself more readily to a poster presentation.

From the audience's perspective, browsing through a poster session at a busy conference offers a pleasant interlude during a tightly scheduled sequence of talks. In addition, because oral presentations are generally brief, with an even shorter question-and-answer period, poster sessions allow for more extended, informal discussions between a researcher and those interested in his or her work. Finally, poster sessions offer a practical solution to the problem of fitting in a large number of presentations during a limited time period.

If you are preparing a poster presentation of your own study, the following advice may help you get started.

■ Follow guidelines closely.

This advice applies whether your poster is for a course assignment, a departmental poster session at your college, or a professional meeting. One conventional way to produce a poster is to mount sections of text along with graphics onto a large piece of mat board or other backing material. Alternatively, you may have access to equipment that enables you to print out the entire poster on a single large sheet of paper that can then be