

bad writing. Your goal when you start is to get your ideas down on paper in any form you can. Incomplete sentences, streams of consciousness, lists of ideas, and outlines are all good ways of getting started. These methods will help you to figure out what you want to say, which is the main purpose of this phase of writing. You don't have to worry about the writing being bad, because you will revise it later.

The second implication of the idea that good writing starts out bad, is that you will revise the bad stuff until it is good. Unfortunately for most of us, our first exposure to writing was for grade school term papers or essays. I don't know about you, but I always did those things the night before, and rarely read them once they were written, let alone revised them. My job was to write, my teacher's job was to read, and no one revised. Once you get the idea that you will keep working on a paper, writing and rewriting it, until all the writing is good, the rest is relatively easy. Here's what you should do during all that revising:

- Scrutinize each paragraph and revise it until it is a good one. Topic sentences are particularly helpful and important. Try to have one main idea for each paragraph. Paragraphs are good when they say what you want to say, and when all the sentences hang together harmoniously. When you are reading and rewriting your paragraphs, read them out loud occasionally to get a feel for their rhythm. (2)
- Scrutinize the glue between your paragraphs. Make sure that the paragraphs fit together nicely. Does each paragraph follow from the last and set up the next?
- Scrutinize each sentence and rewrite it until it is a good one. (3) I assume you can tell a good sentence when you hear one, so read your stuff out loud to test it on your ear.

That's all there is to it. Write down everything you want to say. Then grovel over the bad stuff until it is good. Here are a few other tips that might help.

Spill the Beans Fast

Unlike murder mysteries who keep the reader from knowing *whodunit* until the very end, a research paper should reveal whodunit and whodunwhat as soon as possible. You should summarize your whole story at the very beginning of your paper, without holding anything back. I don't mean that you should just describe what you set out to do, but you should also tell the reader what you found out. You should put your best stuff up front.

Now this tip about spilling the beans fast makes real sense. Assuming that you are writing the paper because you did something very clever and you want everyone to know about it, then you might as well start letting them know at the beginning of your paper. Most folks aren't going to hang around to read the whole thing anyway, so you have your best shot at revealing how devilishly ingenious you really are if you do it right away:

- Spill the beans in the title,
- Spill the beans in the abstract,
- Spill the beans in the introduction, and
- Spill the beans in the body.

When you are spilling the beans at the beginning of your paper, don't just refer to your results, *give* your results. Use simple summaries of your most important points. For instance:

Wrong way: In this paper I will give you my formula for good writing.

Right way: My formula for good writing is simple - once you decide that you want to produce good writing and that you can produce good writing, then all that remains is to write bad stuff, and to revise the bad stuff until it is good.

I find it useful to spill the beans at the end of the introduction. This is a good place for bean spilling because the introduction has provided the reader with the background needed to understand the message, and because a simple statement of the message at this point improves the transition from introductory stuff to the main exposition. If you do a good job of spilling the beans in the introduction, then the introduction stands on its own, summarizing the entire paper.

Don't Get Attached to Your Prose

Suppose you've worked very hard on a sentence that was giving you trouble. Not only did you fix the problem with it, but you've made it into the best sentence you've ever written, probably the best sentence anyone has ever written in the entire state of Pennsylvania, a real prize-winner. It has a melodious ring and rhythm that will make you famous. Unfortunately, after some other revisions to your paper and some more thinking, you find that your prize-winning masterpiece doesn't say quite what you intended to say, or that part it is part of a paragraph that must now be eliminated for some other reason. What to do? (Multiple choice :)

- Maybe if you move the sentence to another paragraph you can make it sound true and keep it.
- Who cares what the paper says anyway. If it sounds good, go ahead and use it.
- Give up this year's prize for literature and flush the damn thing.

I've used all three methods, but only the last one really works. So here's a technique that will help you discard a good sentence or paragraph that doesn't really belong in your paper: Create a special file called PRIZE_WINNING_STUFF.TXT. Move all deleted text to this file. Should you find a new home for your special sentence later, either in this paper or some other paper, you are assured that it will still be in good health, available for resurrection at an instant's notice. I find that using a "refuse file" for all the well-written text that I don't need permits me to get on with the task of telling my story, without worrying too much about losing potentially useful intermediate results. By the way, I've often been surprised at how mediocre last year's prize-winning sentences are when read a year later.

How to Get Unstuck

There usually comes a point in writing a paper when you get stuck. You try generating several descriptions or statements, but nothing you write seems to work. When this occurs, it is likely that you don't have a clear idea what you want to say, or you don't fully understand some of the things you planned to explain. This is normal - it takes more understanding to explain clearly what you did, than it took to do it.

When you are stuck, try listing the points you want to make. Then return to writing sentences and paragraphs, and to revising. An outline can be very useful when you're stuck, especially when you have already begun to write text. You may find that you can write good paragraphs that clearly express parts of your story, but you still have trouble with the overall organization of your paper. For instance, after generating several pages of text you read them to find that they ramble and repeat, and that parts of your story are missing. You can't figure out what you're trying to say. At this point you should make a new outline and reorganize using the following procedure:

1. Write down the topic of each paragraph you have written, in one or two words each.

2. Shuffle the topics into a coherent outline, adding topics as necessary.
3. Rearrange the paragraphs of text to follow the organization of the outline.
4. Revise the shuffled document, and add text for the added topics.

This procedure will often help you figure out what you've done, what's missing, and to get back on the right track. Occasionally, you may even try this on a sentence by sentence basis.

An important step in producing good writing is to get feedback from a friend or colleague about your work. I have two more tips for this aspect of good writing.

Husband Your Readers

Serious review of your writing by someone other than yourself is an essential ingredient in making your writing clear and good. However, readers who will carefully review your work are a precious resource you must conserve. It is difficult to get someone to read your stuff carefully even once, and you probably have only a very few friends who are devoted enough (or demented enough) to do it twice.

Most readers are only effective for one reading anyway, because they know too much about what you are trying to say by the time they attempt a second pass.

Ideally, you shouldn't show your paper to anyone you've written all the sections and fixed every problem you know about. Every sentence should have good grammar. Include all the figures, at least in sketch form. Circulate a draft to just one or two people at a time. It is unpleasant to go to work when everyone in your building is hiding from you because they haven't gotten around to looking at today's draft of your paper yet. The basic idea is that you as the writer should do whatever hard work you can do in preparing your paper. Your readers should be saved for the special task of giving you a fresh perspective on what you have written, and for telling you what is not clear.

There is an important exception to this rule. You may find it useful to get help with the overall organization of your paper in the early stages of its development. The purpose of this sort of review is to focus on the broad thrusts and concepts in your technical exposition, rather than on the details or wording. The best source of this kind of feedback is someone with a broad and mature view of your research area.

Trust Your Readers

When you get comments back from your readers, trust what they tell you. If they get confused at a particular point, don't argue with them explaining why what you wrote really is clear. Rewrite that part to overcome whatever confused your reader. You'll be surprised to find that more than one reader will get stuck in the very same place in your paper, even though what you wrote was perfectly clear, and they just confused themselves. When a reader marks a word or sentence in your paper, they are telling you that *something is wrong* here. It is not necessary that you take the specific advice that a reader gives. Their suggested correction may be good, or you might generate a better one.

That's all there is to it. Now you can produce good writing. My main points are:

- *You must want to produce good writing.*
- *You must have confidence that you can produce good writing.*
- *Good writing is bad writing that was rewritten.*
- *Spill the beans right away.*
- *Don't be a slave to your prose.*

- *Outlining helps to get unstuck.*
- *Husband your readers.*
- *Trust your readers.*

1) I admit it. There are a few jerks out there who do write the perfect stuff the first time and who don't have to work hard to make their writing good. But I'm assuming that you don't belong to this class of disgusting individuals

2) There is nothing wrong with repeating the same phrase several times in one paragraph to improve the clarity. If several sentences that follow one another all refer to the same thing, then use exactly the same name for the thing each time. For some reason, we are taught to randomly vary wording to avoid repetition. This practice makes binding antecedents much harder.

3) I said I wouldn't give details of what makes good writing *good*, but I can't resist saying a few things. Of course, the grammar must be perfect. Avoid run-on sentences. I get particularly annoyed by sentences that use words with unclear antecedent. For instance, their might be three "it"s in one sentence, each referring to something different. Substitute the same words that were to mean "it" in the first place. Another pitfall is to write "*the* whatsit," when no whatsit has yet been mentioned.