Schimel's *Writing Science* In a Sheet: Quotes and Reference Guide

Ch1: *Writing in Science*

As a scientist, you are a professional writer.

It is the **author's job** to make the **reader's job easy**.

If you are going to be a successful writer, learn to embrace the pain and **enjoy the process**.

Ch2: *Science Writing as Storytelling*

Scientists feel their job is simply to "present the work," and so do a poor job of **highlighting the story**.

Data → Information → Knowledge → UNDERSTANDING

Develop your story from the bottom up (data); tell it form the top down (understanding).

Ch3: *Making a Story Sticky*

S: Simple = the core essence
U: Unexpected = the unknown, a gap
C: Concrete = data vs. abstract ideas
C: Credible = ground ideas in lit.
E: Emotional = engage curiosity
S: Stories = integrated smaller units

Your job is to find what is novel and highlight the unexpected elements.

Ch4: *Story Structure*

***OCAR**:* Opening, Challenge, Action, Resolution; slow
***ABDCE**:* Action, Background, Development, Climax, Ending; frontloaded structure, use in proposals
***LDR**:* Lead, Development, Resolution; fast, as in *Nature*
***LD**:* L and D; fastest story, all up front
Introduction 3 Sections: Opening, Background, Challenge
Methods & Results: the action – what did you do and find?
Discussion: Climax and Resolution. What did it all mean?

Ch5: *The Opening*

Three Goals: identify the problem, introduce your characters, target an audience
Bad openings create either **misdirection** or **no direction**
Be aware of the **schemas** held by your **audience**
Engage a broader audience 2 steps: open with a **wide-appeal issue** and **modulate the idea** to your focus area
To write well, you need to learn how to the the **power of the opening** (pawn-pushes vs. queen launches).

Ch6: *The Funnel, Connecting O & C*

When you **frame the knowledge gap**, you provide the background information…to understand the story.
Frame the gap with SUCCES, esp. U/E
Intros state a **problem** and **question**
Introductions ≠ Literature Reviews,
Intros identify boundaries of knowledge and synthesize it into HOLES

Ch7: *The Challenge*

Challenges focus on knowledge gained.
If you don't have a **question**, you're *not doing good science*.
Make your question explicit.
State the **challenge** after the question (e.g., to learn X, we did Y).
Objectives focus on the information collected, resulting in weak story telling.

Ch8: *Action*

Action = Methods, Results, Discussion
You are not just presenting your results, ***you're telling a story***.
Methods – brief overview before details
Results – murder your darlings; use LD structure; stats are not stories
Discussion – *the* critical act of **creativity**
use LDR structure; build to Resolution

Ch9: *The Resolution*

The Resolution is your take home message, your strongest and most memorable words***.***
Good resolutions *shows how understanding is* ***advanced***, ***connecting*** to the opening **problem**.
Bad resolutions are *weak*, *distracting* or *undermine* conclusions; resolutions are ***not*** the place for *uncertainty.*
Condense your resolution to: (1) **synopsize** key results, (2) **synthesize** those results, (3) **contribute** to fixing a problem.

Ch10: *Internal Structure*

Tension is the emotional drive (**curiosity**) to keep reading.
Build and reward curiosity through story arcs; create a series of **nested arcs** from sentences to the whole paper.
In each paragraph or section, ask: (1) Is there a single, clear point? (2) Are linkages within section paragraphs clear? (3) Are there any extraneous words that break serial arcs? (4) Does each new topic have a resolution? (5) Is every unit defined by sub-heads or clear opening text?

Ch11: *Paragraphs*

Start with a topic sentence; support it with development statements
Point First: Topic Sent. – development; 75% of paragraphs are TS-D
Point Last: LDR or OCAR structure - 25% of paragraphs; use at critical story transition points; need a strong beginning and ending

Ch12: *Sentences*

Sentences follow OCAR; opening = topic; resolution = stress point
2-3-1 Rule of Sentence Emphasis
Good sentences have: 1) short and clear topics, 2) a main verb that immediately follows topic, 3) key message at the stress point (end).
Long sentences need an LD structure.

Ch13: *Flow*

Create flow by writing sentences on the same **team** or sentences in a **relay**.
Lists are hard, the reader has to figure out how things fit together (=choppy).
Stories are easy because the author shows the relationships.
Connect story arcs through stress – topic linkages.

KNOW AND LISTEN TO YOUR CHARACTERS

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Ch14: *Energized Writing*

Showing action is the job of verbs; they imbue life in papers. Writers emasculate verbs by using:

1) Passive voice – weakens structure, hides the actor
2) Fuzzy verbs – say *something* happened, but not *what*
3) Nominalizations – turn a verb into a noun

Adjective nominalizations (adj. -> noun) create jargon.

Objectivity does not come from how you treat your *writing*, but from how you treat your *data*.

Ch15: *Words*

When writing is good, ***we notice the ideas and the data***, and those are what make science.

Use terms that work for your audience: avoid jargon, define abbreviations on first use, use common words.

Latin or French words feel heavy and formal; use English.

Avoid jargon, pick short words, **eliminate** prepositional phrases; replace prepositional phrases with compound nouns, but AVOID noun trains (4+ nouns together).

Ch16: *Condensing*

Brevity comes from selection, not compression. Prune, then shake.

Each word *should do work*: add content, clarify meaning, provide coherence.

When condensing, **delete**:
1) redundancies, 2) the obvious, 3) modifiers (adj. and adv.), 4) metadiscourse, and 5) verbosity.

Ch17: *Putting it all Together: Editing*

Structure: get the story structure right

Clarity: ensure your ideas are concrete

Flow: make ideas flow, connect arcs

Language: make it sound good

Writing is a process of experimentation and revision: there is no single "right answer."

READ IT OUT LOUD

Ch18: *Limitations*

How do you address the negatives without undermining the positives?

Air your dirty laundry up front.

Problems arise from mismatch between questions and methods; intro should promise the story you will deliver.

Methods limitations go in that section; interpretation limits go in discussion.

Ch19: *Writing Global Science*

Writing is hard for *all of us*. The hardest part, though, *is developing the story and laying it out cleanly.*

Doing science requires both **confidence** and **humility**.

To publish papers in *good journals*, you need a NEW story.

Science isn't complete until it is published.

Editors see many papers rigorously done, but that only offer information, not new knowledge.

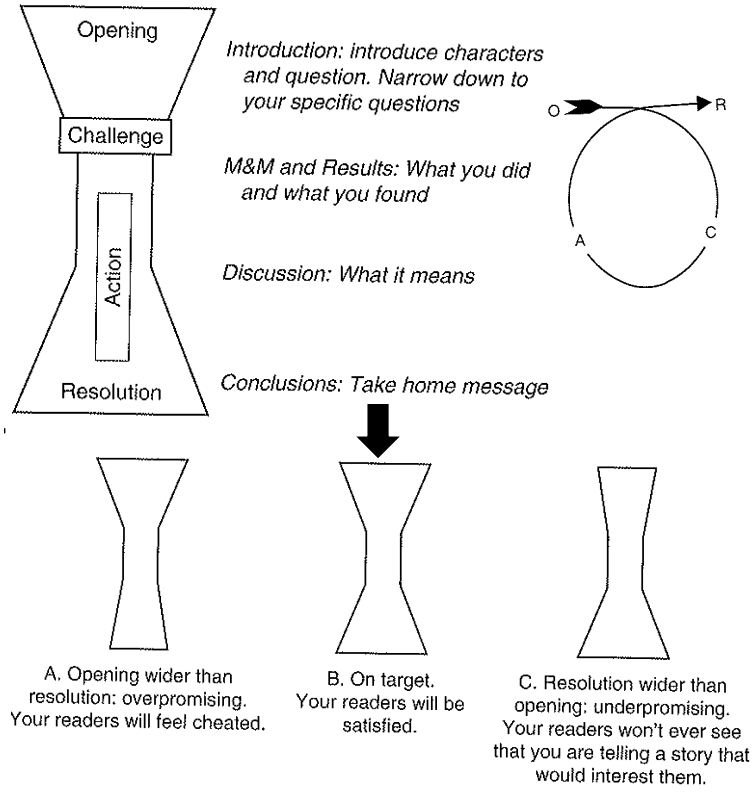
Pick a journal appropriate to your story and audience.

Ch20: *Writing for the Public*

Public writing requires: 1) a simple story, 2) focus on "who knew" or an application, 3) LDR structure with lots of SUCCES, 4) simple language, 5) realistic view of science.

We need to do a better job **educating the public** about the ***content*** of research AND the ***nature*** of research.

Message Box: Issue/Audience to explain (A) the problem, (B) why they should care, (C) solutions, and (D) benefits.



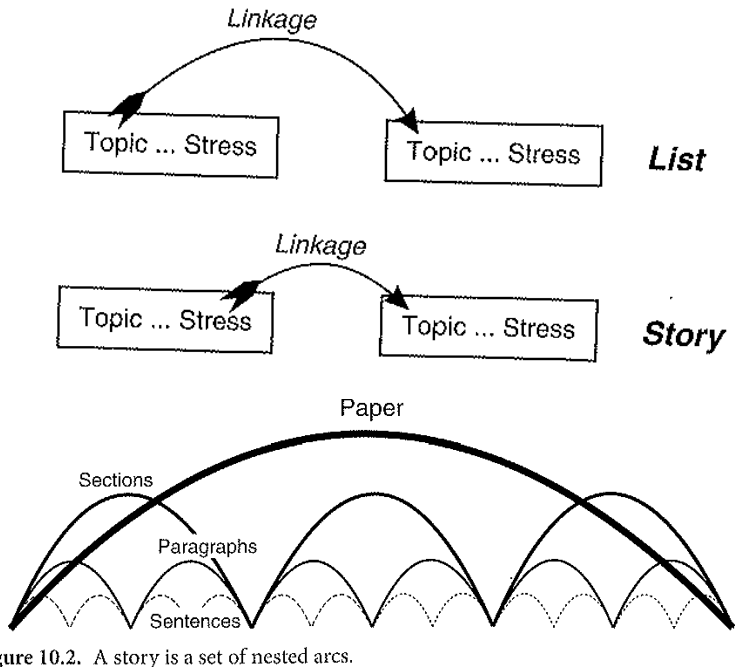


Figure 10.2. A story is a set of nested arcs.

Compiled by Amy Burgin, 10/12/16

Schimel's *Writing Science* Tables Reference Page

Table 14.1: Fuzzy verbs vs. action verbs.

Fuzzy (Weak) Verbs	Action (Strong) Verbs
Occur	Modify
Affect	Accomplish
Facilitate	Create
Perform	Increase
Conduct	Decrease
Implement	Invade
	React
	Inhibit
	Disrupt
	Accelerate
	Migrate

Table 14.3: Adjective nominalizations.

Adjective	Nominalization
Different	Difference
Difficult	Difficulty
Able	Ability
Capable	Capability
Similar	Similarity

Table 14.2: Verbs and their nominalized equivalents.

Verb	Nominalization
Move	Movement
Differ	Difference
Suggest	Suggestion
Interact	Interaction
Analyze	Analysis
Develop	Development
	In some cases, the verb and nominalization have similar forms
Influence	A influenced B *vs*. A had an influence on B
Approach	A approached the problem… *vs*. A took an approach to…
Yield	The reaction yielded… *vs*. The yield of the reaction was…

Table 15.2: Examples of long French/Latin and short Anglo-Saxon words.

Long French or Latin	Short, Anglo-Saxon Word
Duration	Length or time
Consume	Eat
Mortality	Death
Permit	Let
Necessary	Need
Demonstrate	Show
Donate	Give
Initiate	Start
Attempt	Try (from old French)
Utilize	Use (from old French)
Methodology	Method (Latin borrowed to English

Table 16.1 Empty Amplifiers

Adjective or Adverb (-ly)
Certain(ly)
Dramatic(ally)
Entire(ly)
High(ly)
Quite
Rather
Real(ly)
Simple(ly)
Substantial(ly)
Very