Cheat Sheet for "The Science of Scientific Writing"

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For individuals striving to improve their writings, "The Science of Scientific Writing" is a must-read article by George D. Gopen and Judith A. Swan, published in *American Scientist,* 78(6) pp 550-558, Nov-Dec 1990. The article powerfully argues for the need to meet the reader expectations for the structure of prose. To assist writers in fulfilling this need, it outlines seven concrete and easy-to-follow structural principles. They are given in this cheat sheet along with brief explanations and short examples when appropriate (also extracted from the article) to serve as a handy reference.

1. Follow a grammatical subject as soon as possible with its verb	
Reason	Reader has a pressing need for syntactical resolution, fulfilled only by the arrival of the verb.
Example	**Poor:** The smallest of the URF's (URFA6L), a 207-nucleotide (nt) reading frame overlapping out of phase the NH2-terminal portion of the adenosinetriphosphatase (ATPase) subunit 6 gene has been identified as the animal equivalent of the recently discovered yeast H+-ATPase subunit 8 gene.
	Revised: The smallest of the URF's is URFA6L, a 207-nucleotide (nt) reading frame overlapping out of phase the NH2-terminal portion of the adenosinetriphosphatase (ATPase) subunit 6 gene; it has been identified as the animal equivalent of the recently discovered yeast H+-ATPase subunit 8 gene.

2. Place in the stress position the "new information" you want the reader to emphasize.	
Reason	Readers naturally emphasize the material that arrives at the end of a sentence, the stress position.
Example	**Poor:** The enthalpy of hydrogen bond formation between the nucleoside bases 2'deoxyguanosine (dG) and 2'deoxycytidine (dC) has been determined by direct measurement. dG and dC were derivatized at the 5' and 3' hydroxyls with triisopropylsilyl groups.
	Revised: We have directly measured the enthalpy of hydrogen bond formation between the nucleoside bases 2'deoxyguanosine (dG) and 2'deoxycytidine (dC). dG and dC were derivatized at the 5' and 3' hydroxyls with triisopropylsilyl groups.

3. Place the person or thing whose "story" a sentence is telling at the beginning of the sentence, in the topic position.	
Reason	Reader needs and expects perspective and context in the topic position.
Example	**Poor:** The rates at which tectonic plates move and accumulate strain at their boundaries are approximately uniform. Therefore, in first approximation, one may expect that large ruptures of the same fault segment will occur at approximately constant time intervals.
	Revised: The rates at which tectonic plates move and accumulate strain at their boundaries are roughly uniform. Therefore, nearly constant time intervals (at first approximation) would be expected between large ruptures of the same fault segment.

4. Place appropriate "old information" in the topic position for linkage backward and contextualization forward.	
Reason	Readers expect the material occupying the topic position to provide them with linkage (looking backward) and context (looking forward).
Example	**Poor:** The rates at which tectonic plates move and accumulate strain at their boundaries are approximately uniform. Therefore, in first approximation, one may expect that large ruptures of the same fault segment will occur at approximately constant time intervals.
	Revised: The rates at which tectonic plates move and accumulate strain at their boundaries are roughly uniform. Therefore, nearly constant time intervals (at first approximation) would be expected between large ruptures of the same fault segment.

5. Articulate the action of every clause or sentence in its verb.	
Reason	Readers expect the action of a sentence to be articulated by the verb.
Example	**Poor:** Transcription of the 5S RNA genes in the egg extract is TFIIIA-dependent. This is surprising, because the concentration of TFIIIA is the same as in the oocyte nuclear extract.
	Revised: In the egg extract, the availability of TFIIIA limits transcription of the 5S RNA genes. This is surprising because the same concentration of TFIIIA does not limit transcription in the oocyte nuclear extract.

6. Try to provide context for your reader before asking that reader to consider anything new.	
Reason	Readers need the opportunity to familarize themselves with a new environment.

7. Try to ensure that the relative emphases of the substance coincide with the relative expectations for emphasis raised by the structure.	
Reason	Readers may otherwise incorrectly interpret the writer's intention.