Clear Scientific Writing: Tools for the Writing Process

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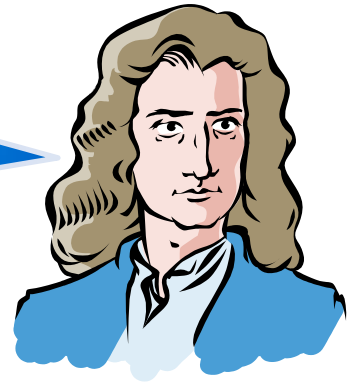November 2, 2015

Clear Scientific Writing

Why is this kind of writing important?

"In science, the credit goes to the man who convinces the world, not to the man to whom the idea first occurs."
--Sir William Osler

This is high-stakes writing!

Clear Scientific Writing

- Why is it high stakes?
  - Funding grants
  - Conference proceedings/paper publication
  - Proposal acceptance

You have to learn to write well to communicate your ideas effectively!

Why Talk About Process?

- Writing isn't something that "just happens"
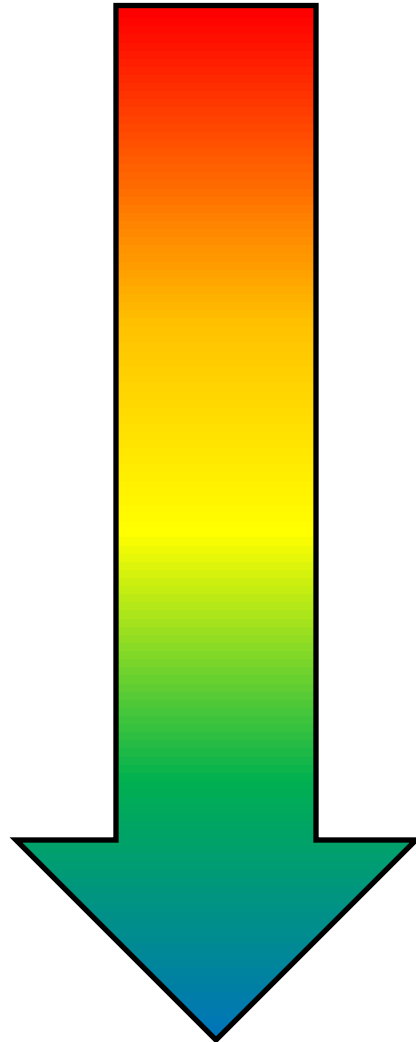
Why Talk About Process?

- Writing doesn't "just happen;" it's a process
- A good process will help you consistently create a good product
- Process requires the right tools to work well

Game Plan: Two Lectures

Today: Higher-order writing concerns

Next time: Lower-order writing concerns

- ✓ **Audience/Purpose**
- ✓ Thesis
- ✓ Paragraph Development
- ✓ Organization

- ✓ Sentence structure
- ✓ Punctuation
- ✓ Word choice
- ✓ Spelling

Who are you targeting? Audience

- Why consider them?
  - Be on the same page
  - Keep up with you
- How to do it?
  - Boil down ideas
  - Make them palatable
- Exercise

© AP

TOOL #1: AUDIENCE ANALYSIS -Questions for consideration-

- Who is your audience?
- Do you think your audience is interested in the topic? Why or why not?
- What your audience already know about the topic?
- What does your audience need to know about the topic?
- What experiences has your audience had that would influence them on the topic?
- What do you hope the audience will gain from your text?

Exercise 1

You're writing an informational letter about UH. Write one or two sentences that state the most important thing(s) to know about UH. Write your letter to:
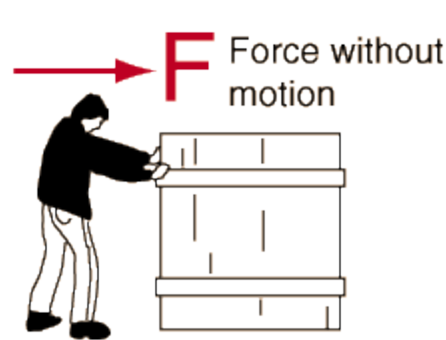
- A high school student thinking about coming here
- An alumni thinking about donating to your department
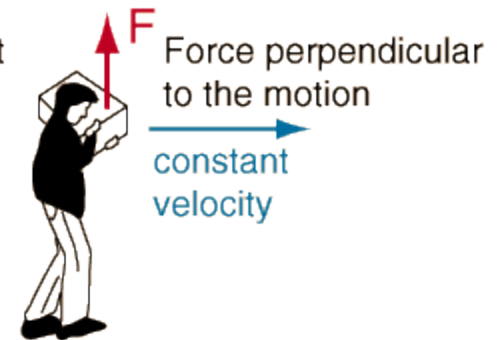- A new graduate student in your department

Time: 5 minutes

Take-away: The way you view your audience will determine the way you choose to communicate with them

Purpose

- Why consider it?
  - Relevant information
  - Works for **you**
- How to do it?
  - Use reader's perspective
  - Identify gaps in knowledge (problem)
  - Fill gaps in knowledge (solution)

F Force without motion

When a force is exerted on an object which does not move, no work is done on the object.

F Force perpendicular to the motion

constant velocity

When an object is carried at constant velocity by a force which acts at right angles to the motion, no work is done on the object.

TOOL #2: EXAMPLES OF PURPOSE

- Summarizing: Presenting the main points or essence of another text in a condensed form
- Arguing/Persuading: Expressing a viewpoint on an issue or topic in an effort to convince others that your viewpoint is correct
- Narrating: Telling a story or giving an account of events
- Evaluating: Examining something in order to determine its value or worth based on a set of criteria.
- Analyzing: Breaking a topic down into its component parts in order to examine the relationships between the parts.
- Responding: Writing that is in a direct dialogue with another text.
- Examining/Investigating: Systematically questioning a topic to discover or uncover facts that are not widely known or accepted, in a way that strives to be as neutral and objective as possible.
- Observing: Helping the reader see and understand a person, place, object, image or event that you have directly watched or experienced through detailed sensory descriptions.

Taken from https://owl.english.purdue.edu/owl/resource/587/01/

Exercise #2

Re-read the assignment for homework #7. Identify which of the purposes listed on the previous slide need to be addressed in the assignment

Time: 5 minutes

Performance Evaluation

In this homework, we will learn how to do performance evaluation of algorithms, systems, or techniques preferably from your area of research. It is also a requirement that you do this assignment in Linux environment.

Pick an algorithm/program/system that already exists in your area of research. You can pick such artifact from your project if they are already available in your research project for this semester.

Profile the system performance (CPU, RAM, Storage, running time, etc) across different workloads or relevant parameters.

Submit a two-page document with four sections. Introduction section will describe in one paragraph the artifact you evaluate. Experiments and metrics section will describe the why and how of experiments you performed and the metrics. Results section describes the results obtained from your experiments. Conclusions section will summarize what you learnt about the artifact.
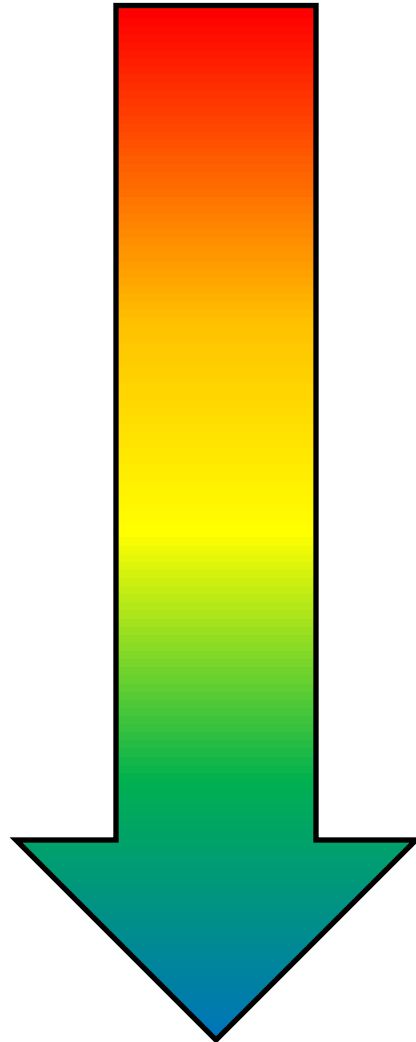
Come up with an appropriate title for your paper.

Please use ACM two-column template for this submission. Your pdf should be named hw7.pdf.

Game Plan: Two Lectures

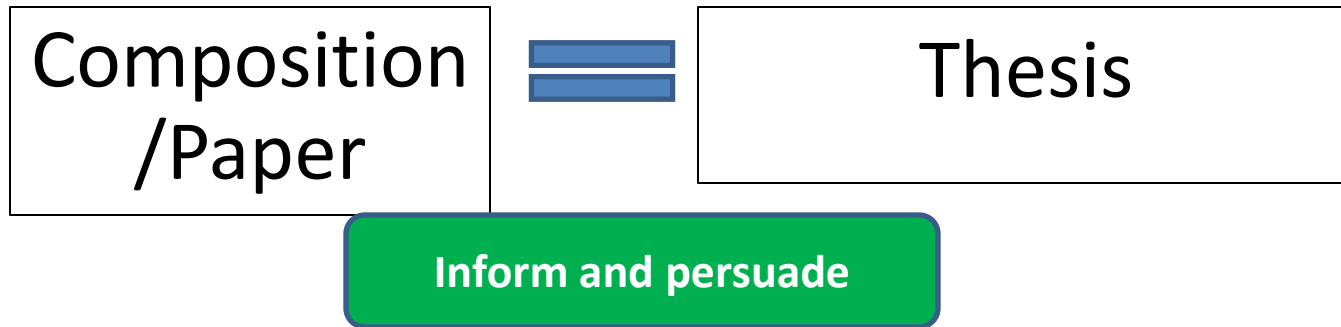Today: Higher-order writing concerns

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Writing strategy: think about purpose

Composition/Paper = Thesis

Inform and persuade

Your purpose is tied to your solution!

Identifying the Problem

- At each level of the writing process, you are providing a solution to a specific kind of problem.

- Composition purpose varies by writer/reader
  - Examples: To inform, to argue, to confirm, to persuade

Problems and Solutions: Composition

"Describe the project you want to pursue this semester. This description must be significantly polished incorporating all the feedback you have received."

- Problem: Reader doesn't know what kind of project you're doing
- Solution: Describe your project
- Purpose: To inform
- Exercise: Replace "describe/description" with the following: "Defend," "Promote," "Suggest"
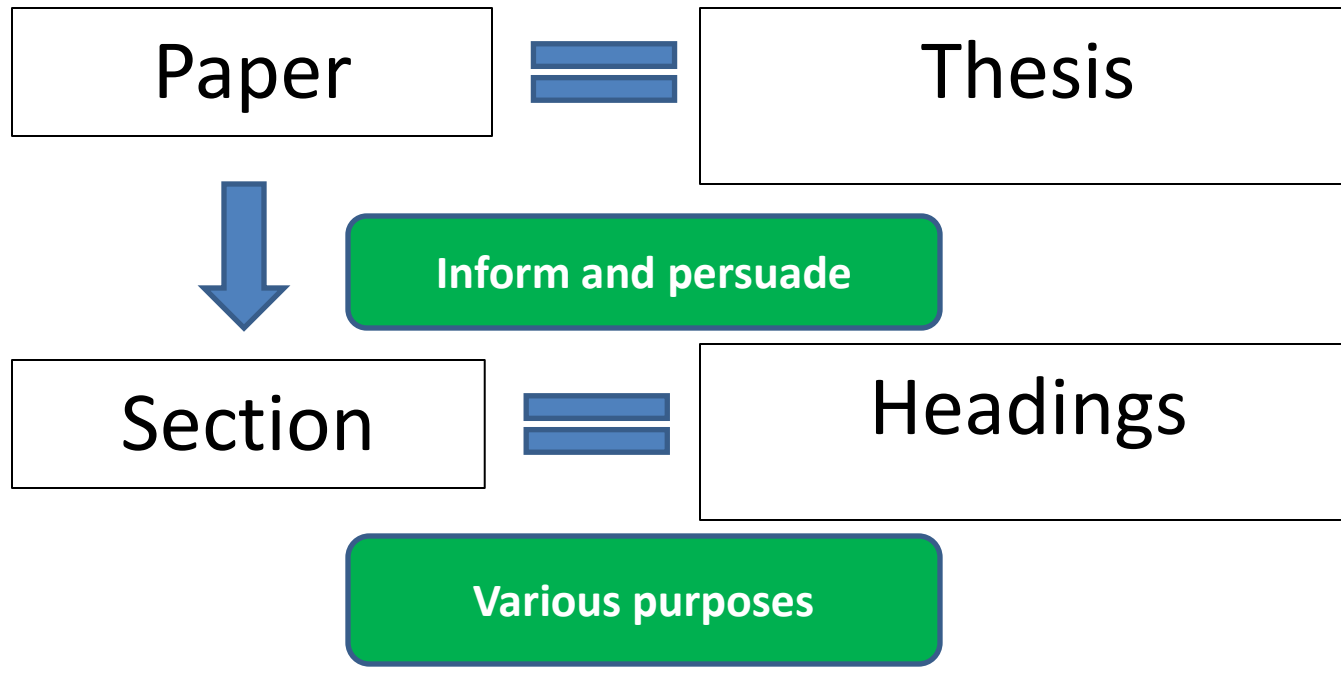
Problems and Solutions: Composition

"Describe the project you want to pursue this semester. This description must be significantly polished incorporating all the feedback you have received."

– Problem: Reader doesn't know what kind of project you're doing

– Solution: Describe your project

– Purpose: To inform

– Exercise: Replace "describe/description" with the following: "Defend," "Promote," "Suggest"

Take-away: Your thesis/focus should address that purpose

Writing strategy: think about purpose

Paper	=	Thesis

↓ **Inform and persuade**

Section	=	Headings

Various purposes

Your purpose is tied to your solution!

Identifying the Problem

- At each level of the writing process, you are providing a solution to a specific kind of problem.
- Section level: section-specific
  - Introduction
  - Conclusion
  - Body
- Section purpose: Tell them what you're going to tell them, tell them, tell them what you told them!
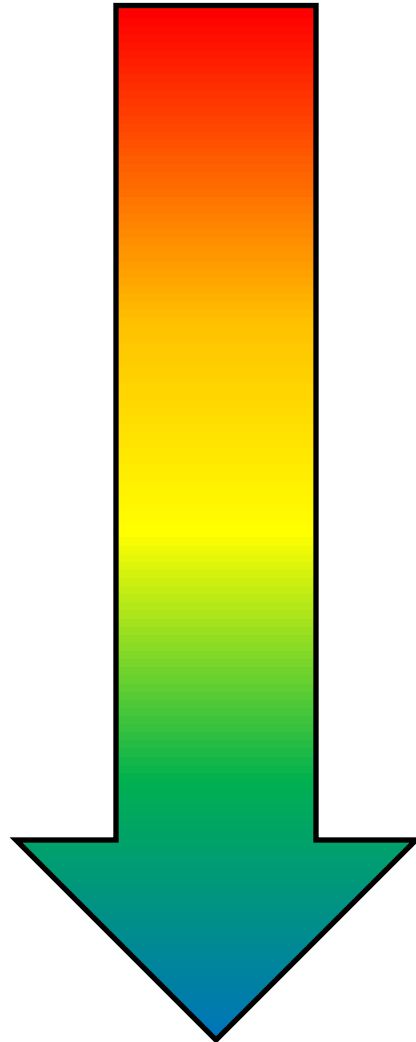
TOOL #3: Intro/Conclusion Questions

- Introduction
  - "What question are you trying to answer?"
  - "What is the context for your work?"
  - "What are you trying to accomplish?"

- Conclusion
  - "So what?"/ "And?"
  - "What have I already said?"
  - "How does it all fit together?"
  - "What are the implications?"

Taken from http://writingcenter.unc.edu/handouts/conclusions/

Game Plan: Two Lectures

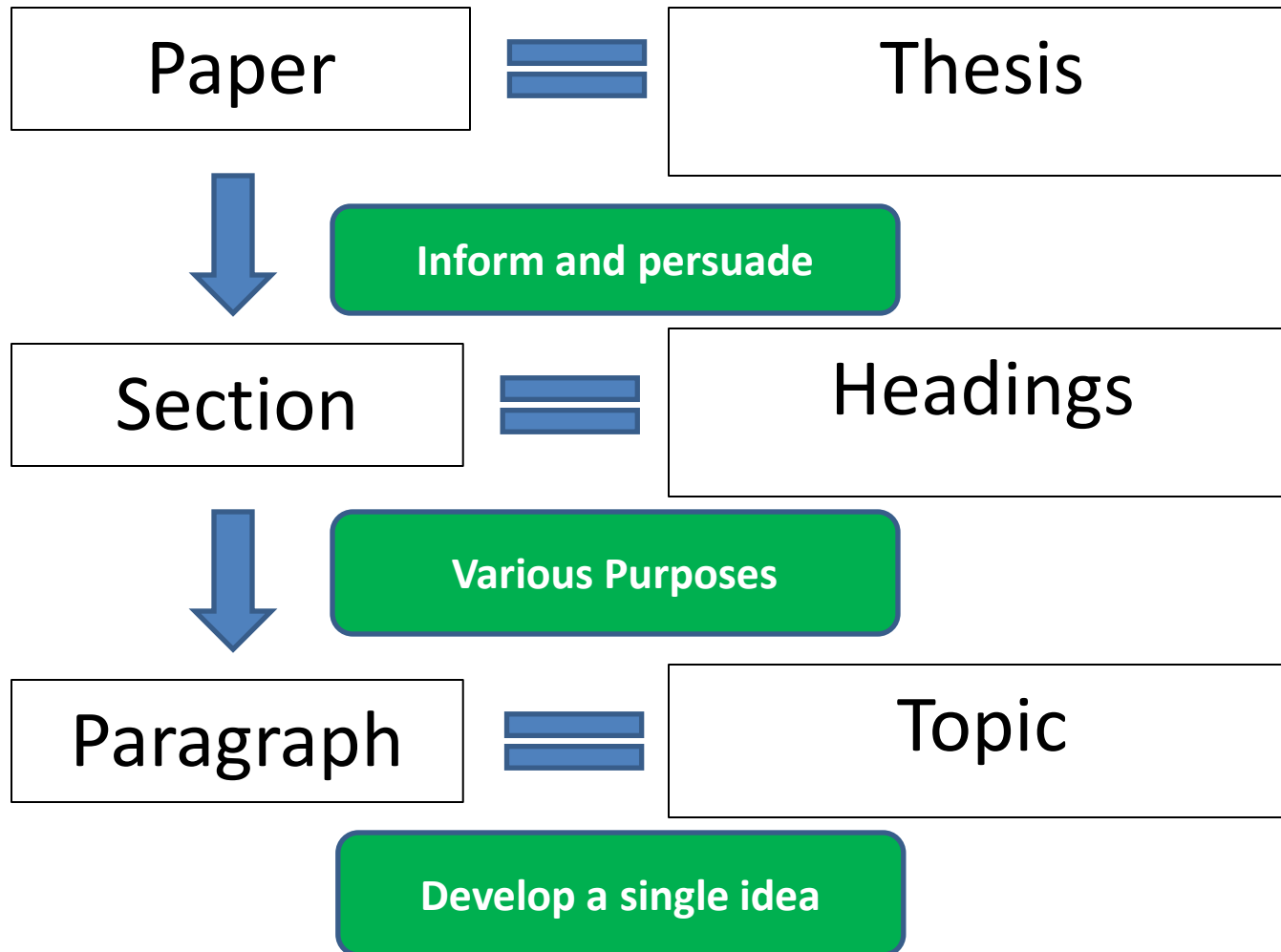Today: Higher-order writing concerns

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Writing strategy: think about purpose

| Paper | = | Thesis |

↓ **Inform and persuade**

| Section | = | Headings |

↓ **Various Purposes**

| Paragraph | = | Topic |

Develop a single idea

Your purpose is tied to your solution!

Identifying the Problem

- At each level of the writing process, you are providing a solution to a specific kind of problem.

- Paragraph level: topic problem
  - Topic sentence
  - Topic development
  - Conclusion/transition

- Paragraph purpose: develop a single idea (topic) for writing

TOOL #4: TYPES OF PARAGRAPH DEVELOPMENT

- Development by detail
  - Expand on a general topic sentence using specific examples or illustrations
- Development by comparison and contrast
  - Describe two or more things which have something, but not everything, in common
- Development by process
  - Describe something going step-by-step, usually in chronological order
- Development by combination
  - Combination of one or more types listed above

Taken from http://arts.uottawa.ca/writingcentre/en/hypergrammar/writing-paragraphs
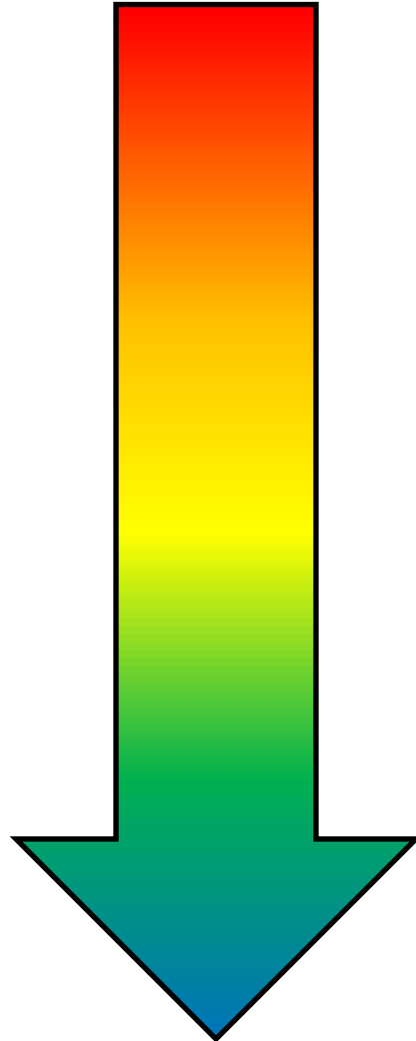
Exercise #3

Read the following paragraph and determine what kind of paragraph development is being used

Security concerns of using this smart power meter is also arising. What kind of security problems can be arised by smart meters? The smart meter causes fire. Yes, they do cause fire, so do analog meter and home appliances. The fire reason should be deeply digged. For example, sometimes, because the resident uses some big power consumption device which results in cable and meters overloading, the fire happens.And also the fire rate because of smart meters should also be investigated. If this rate is much higher than analog device, then smart meter is not accepted. Another issues includes safety of privacy data and preventing being hacked from hostile attack. I believe that computer scientists do have solution to solve these problems. Therefore security is not an abstacle.

Game Plan: Two Lectures

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TOOL #5: REVERSE OUTLINING

- In the *left-hand* margin, write down the **topic** of each paragraph. Try to use as few words as possible. When revising your own work, these notes should tell you if each paragraph

    Purpose: When revising, these notes should tell you if each paragraph is focused and clear.

- In the *right-hand* margin, write down how the paragraph topic advances the overall argument of the text.

    Purpose: When revising, these notes should tell you if each paragraph fits in the overall organization of your paper. You may also notice that paragraphs should be shifted after completing this step.

Forces you to summarize!

Exercise #4

Reverse outline step #1: What is the topic of this paragraph?

Security concerns of using this smart power meter is also arising. What kind of security problems can be arised by smart meters? The smart meter causes fire. Yes, they do cause fire, so do analog meter and home appliances. The fire reason should be deeply digged. For example, sometimes, because the resident uses some big power consumption device which results in cable and meters overloading, the fire happens.And also the fire rate because of smart meters should also be investigated. If this rate is much higher than analog device, then smart meter is not accepted. Another issues includes safety of privacy data and preventing being hacked from hostile attack. I believe that computer scientists do have solution to solve these problems. Therefore security is not an abstacle.

Conclusions

- Incorporate these 5 tools into your writing process
  - Audience analysis
  - Examples of purpose
  - Introduction/conclusion questions
  - Types of paragraph development
  - Reverse outlining
- Learn how to self-assess a piece of writing
- Examine your writing process

Questions?