The importance of clarity in science

That's an interesting question. Certainly, precise determination of current temporal state is of utmost practical importance. While it is not possible to provide definite answers within the present context, future work will... Ya mean you don't know the time?
Coherence: the text makes sense

“...is an experience we create for ourselves as we make our own sense of what we read” (Williams 2007).

Reader’s have:

• **Genre expectations** (e.g., IMRaD, referencing system)
• **Field & department expectations** (e.g., assignment description)
• **Explicit expectations the text sets up** (e.g., aim to be achieved)
• **Implicit expectations about how texts work** (e.g., how information placement shapes what readers expect from the text)
Global level: a sense of the whole; understanding of what all sentences/paragraphs/sections add up to.

Local level: a clear sense of what an individual paragraph or an individual sentence communicates.

Cohesion: the text “flows”
well-connected paragraphs and sentences, largely dependent on how one ends and the next one begins.
Coherence (the pieces make sense as a whole)

Cohesion (two pieces fit together)
Degree to which errors bother readers

Word choice
Word location
Sentence structure
Sentence location
Paragraph structure
Paragraph location
Section structure
Section location

Bothers little
Bothers a lot

Modified from *Scientific Writing and Communication* (Hofmann)
Global Coherence

1. There’s a point
2. Everything is relevant
3. There’s an order

See Style: Lessons in Clarity and Grace (Williams 2007)
Global Coherence

1. There’s a point
   A. Short introductory segment for sections, sub-sections, and paragraphs
   B. The end of the intro segment is *the point/topic*
   C. The end of the point sentence contains words/concepts that you develop in that section.

2. Everything is relevant

3. There’s an order
INTRODUCTION

• Context
• Problem
• Why we should care
• What other people have said about the problem
• Point of this text
  (formulated as an aim & RQ or a main claim)

First body section

Introduction segment to the section including appropriate context and the “point” of the section

For middle paragraphs, most readers look for the “point” in the 1st or 2nd sentence.
Thirty sixth-grade students wrote essays that were analyzed to determine the effectiveness of eight weeks of training to distinguish fact from opinion. That ability is an important aspect of making sound arguments of any kind. In an essay written before instruction began, the writers failed almost completely to distinguish fact from opinion. In an essay written after four weeks of instruction, the students visibly attempted to distinguish fact from opinion, but did so inconsistently. In three more essays, they distinguished fact from opinion more consistently, but never achieved the predicted level of performance. In a final essay written six months after instruction ended, they did no better than they did in their pre-instruction essay. Their training had some effect on their writing during the instruction period, but it was inconsistent, and six months after instruction it had no measurable effect.

Example from Style: Lessons in Clarity and Grace (Williams & Bizup 2017)
Thirty sixth-grade students wrote essays that were analyzed to determine the effectiveness of eight weeks of training to distinguish fact from opinion. That ability is an important aspect of making sound arguments of any kind. In an essay written before instruction began, the writers failed almost completely to distinguish fact from opinion. In an essay written after four weeks of instruction, the students visibly attempted to distinguish fact from opinion, but did so inconsistently. In three more essays, they distinguished fact from opinion more consistently, but never achieved the predicted level of performance. In a final essay written six months after instruction ended, they did no better than they did in their pre-instruction essay. Their training had some effect on their writing during the instruction period, but it was inconsistent, and six months after instruction it had no measurable effect.
In this study, thirty sixth-grade students were taught to distinguish fact from opinion. They did so successfully during the instruction period, but the effect was inconsistent and less than predicted, and six months after instruction ended, the instruction had no measurable effect. In an essay written before instruction began, the writers failed almost completely to distinguish fact from opinion. In an essay written after four weeks of instruction, the students visibly attempted to distinguish fact from opinion, but did so inconsistently. In three more essays, they distinguished fact from opinion more consistently, but never achieved the predicted level of performance. In a final essay written six months after instruction ended, they did no better than they did in their pre-instruction essay. These results suggest that short-term training to distinguish fact from opinion has no consistent or long-term effect.
Topic Sentences

1. Should clearly and specifically introduce the main idea of that paragraph.

2. Limit what is going to be in the paragraph.
In Russia, the Siberian silk moth is an important disturbance factor and since it is migrating into new areas further west and north it may become a larger problem. Insects in the European Russia do not seem to be such of a problem as in Siberia (Shorohova et al., 2009). In North America, insects are an important disturbance factor but there are regional differences. The only province experiencing severe attack from mountain pine beetle is British Columbia, but its range is projected to expand. Spruce budworm is present over all of Canada. In Fennoscandia the European spruce bark beetle is the most important insect, but it has so far not shown the same severe damage to large regions as the outbreaks of mountain pine beetle in Canada.

Note: grammar errors not fixed.
From a BSc thesis (2011)
Levels of insect disturbance in a particular region varies according to the species present. In Russia, the Siberian silk moth is an important disturbance factor and since it is migrating into new areas further west and north it may become a larger problem. Insects in the European Russia do not seem to be such of a problem as in Siberia (Shorohova et al., 2009). In North America, insects are an important disturbance factor but there are regional differences. The only province experiencing severe attack from mountain pine beetle is British Columbia, but its range is projected to expand. Spruce budworm is present over all of Canada. In Fennoscandia the European spruce bark beetle is the most important insect, but it has so far not shown the same severe damage to large regions as the outbreaks of mountain pine beetle in Canada.
1. In addition to providing habitats and the possibility for species to migrate in the landscape, green infrastructure has the role of providing ecosystem services.

1a. In addition to providing ecosystem services, green infrastructure provides habitats and the possibility for species to migrate in the landscape.

2. In order to create a habitat for certain species or achieve a certain ecosystem service, a minimum biotope area may be required within the landscape.
Global Coherence

1. There’s a point

2. Everything is relevant
   A. Anything can be relevant, but it depends on the main idea of the paragraph or section.
   B. Not everything that seems relevant to you will be relevant to your readers

3. There’s an order
We analyzed essays written by sixth-grade students to determine the effectiveness of training in distinguishing fact from opinion. In an essay written before training, the students failed almost completely to distinguish fact and opinion. These essays were also badly organized in several ways. In the first two essays after training began, the students attempted to distinguish fact from opinion, but did so inconsistently. They also produced fewer spelling and punctuation errors. In the essays four through seven, they distinguished fact from opinion more consistently, but in their final essay, written six months after completion of instruction, they did no better than they did on their first essay. Their last essay was significantly longer than their first one, however. Their training thus had some effect on their writing during the training period, but it was inconsistent and transient.
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Global Coherence

3. There’s an order
(of the whole, of sections, of paragraphs)

A. Chronological (time)
   A. As a narrative
   B. Cause and effect
   C. Earlier to later

B. Coordinate (pillars)
   A. Simple to complex
   B. More familiar to less familiar
   C. Less contestable to more contestable
   D. More important to less important (or vice versa)

C. Logical
   A. General analysis to specific applications
   B. Example to generalization
   C. Assertion to contradiction
   D. Argument-focused: claim-reasons-evidence
Global Coherence

3. There’s an order
(of the whole, of sections, of paragraphs)
   A. Chronological (time)
      A. As a narrative
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   C. Logical
      A. General analysis to specific applications
      B. Example to generalization
      C. Assertion to contradiction
      D. Argument-focused: claim-reasons-evidence

Remember! The finished product’s order might not be the order you encountered the information or the order you wrote the information (a narrative of your thinking isn’t always the best for the finished product.)
Cohesion: the text “flows”

well-connected sentences and paragraphs largely dependent on how one ends and the next one begins.

1. Repetition of the subject or “main character.”
2. Often uses old-to-new information structure.
3. Uses linking and transition words effectively (but these shouldn’t be used to “fake” a connection!).

Williams, Style: Lessons in Clarity and Grace & Booth, et al, The Craft of Research
The sensory receptors of the auditory system in mammals are the auditory hair cells of the inner ear. Two functionally and structurally different types of mammalian auditory hair cells exist—inner and outer hair cells. While mechanical stimuli are transformed to neural signals in the inner hair cells (Chan and Hudspeth, 2005), outer hair cells do not transmit neural signals to the brain. Instead, when sound enters the inner ear, outer hair cells magnify it mechanically through electromotility, or oscillations at the sound frequency (Brownell, 1985).
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Old to new structure

• Creates “flow” in a paragraph

• Some try to use logical connectors like “moreover” and “however” to establish flow....but these don’t work on their own

• Instead, follow a progression from old information (in the subject position or toward the end of the previous sentence) to new information (toward the end of the next sentence). Think: the reader needs to understand X before you can introduce Y.

• Must be balanced with some repetition of the main “character” in the passage.
A or B?

A. Some astonishing questions about the nature of the universe have been raised by scientists studying black holes in space. A black hole is created by the collapse of a dead star into a point perhaps no larger than a marble. So much matter compressed into so little volume changes the fabric of space around it in puzzling ways.

B. Some astonishing questions about the nature of the universe have been raised by scientists studying black holes in space. The collapse of a dead star into a point perhaps no larger than a marble creates a black hole. So much matter compressed into so little volume changes the fabric of space around it in puzzling ways.
A. Some astonishing questions about the nature of the universe have been raised by scientists studying black holes in space. A black hole is created by the collapse of a dead star into a point perhaps no larger than a marble. So much matter compressed into so little volume changes the fabric of space around it in puzzling ways.

B. Some astonishing questions about the nature of the universe have been raised by scientists studying black holes in space. The collapse of a dead star into a point perhaps no larger than a marble creates a black hole. So much matter compressed into so little volume changes the fabric of space around it in puzzling ways.
According to a recent survey, 26% of all American adults, down from 38% 30 years ago, now smoke. This _________ can be partly attributed to the mounting evidence linking smoking and fatal diseases, such as cancer.

Swales & Feak, Academic Writing for Graduate Students
Sayner, Wisconsin, is the snowmobile capital of the world. The buzzing of snowmobile engines fills the air, and their tank-like tracks crisscross the snow. The snow reminds me of Mom’s mashed potatoes, covered with furrows I would draw with my fork. Her mashed potatoes usually make me sick—that’s why I play with them. I like to make a hole in the middle of the potatoes and fill it with melted butter. This behavior has been the subject of long chats between me and my psychologist.
“Moral climate” is created when an objectivized moral standard for treating people is accepted by others. Moral climate results from norms of behavior that are accepted by society whereby if people conform they are socially approved of, or if they don’t they are shunned. Moral climate acts as a reason to refrain from saying or doing things that they community does not support. A moral climate encourages individuals to conform to a moral standard and apply that standard to their own circumstances.

Modified from Williams & Bizup, Style: Lessons in Clarity and Grace
Paragraphs need balance between:

• Old-new structure
• Clear main “character” in the passage, often in the subject position of the sentence.
• Linking words
The sensory receptors of the auditory system in mammals are the auditory hair cells of the inner ear. Two functionally and structurally different types of mammalian auditory hair cells exist—inner and outer hair cells. While mechanical stimuli are transformed to neural signals in the inner hair cells (Chan and Hudspeth, 2005), outer hair cells do not transmit neural signals to the brain. Instead, when sound enters the inner ear, outer hair cells magnify it mechanically through electromotility, or oscillations at the sound frequency (Brownell, 1985).
### Linking words & transition phrases

Table 6.1: Transition words, phrases, and sentences

<table>
<thead>
<tr>
<th>USE</th>
<th>TRANSITION WORDS</th>
<th>TRANSITION PHRASE</th>
<th>TRANSITION SENTENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition</td>
<td>again, also, further,</td>
<td>In addition to X, we...</td>
<td>Further experiments showed that...</td>
</tr>
<tr>
<td></td>
<td>furthermore, in addition,</td>
<td>Besides X,...</td>
<td></td>
</tr>
<tr>
<td>Conversion</td>
<td>clearly, evidently,</td>
<td>As seen in...</td>
<td>Granted that X is...</td>
</tr>
<tr>
<td></td>
<td>obviously, undeniable</td>
<td>In the same way...</td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>also, likewise, similarly,</td>
<td>On one hand, or the other hand...</td>
<td>When A is compared with B...</td>
</tr>
<tr>
<td></td>
<td>etc.</td>
<td>Despite X...</td>
<td>As reported by...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlike X...</td>
<td>When compared to...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On the contrary...</td>
<td>One difference is that...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Although X differed...</td>
</tr>
<tr>
<td>Example</td>
<td>for example, specifically</td>
<td>To illustrate X...</td>
<td>An example of X is that...</td>
</tr>
<tr>
<td>Explanation</td>
<td>here, therefore, in short</td>
<td>Because of X...</td>
<td>That is...</td>
</tr>
<tr>
<td>Purpose</td>
<td>for this purpose,</td>
<td>In this experiment...</td>
<td>One reason is that...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For the purpose of...</td>
<td>Because X is...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To this end...</td>
<td>The purpose of X was to...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To determine XYZ, we...</td>
<td></td>
</tr>
<tr>
<td>Result</td>
<td>consequently, generally,</td>
<td>As a result of...</td>
<td>Evidence for XYZ was that...</td>
</tr>
<tr>
<td></td>
<td>hence, therefore, thus</td>
<td></td>
<td>Analysis of ABC showed that...</td>
</tr>
<tr>
<td>Sequence/</td>
<td>after, finally, first,</td>
<td>After careful analysis of X...</td>
<td>After X was completed,...</td>
</tr>
<tr>
<td>time</td>
<td>later, last, meanwhile,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>next</td>
<td>During centrifugation...</td>
<td>When we determined X...</td>
</tr>
<tr>
<td>Summary</td>
<td>in brief, in conclusion,</td>
<td>To summarize our results...</td>
<td>As a summary of our results...</td>
</tr>
<tr>
<td></td>
<td>in fact, in short, in</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>summary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Hofmann's
*Scientific Writing and Communication* (p. 110)
Nikita’s experience had several aspects. The respondent perceived the city in a way that he imagined it. Moreover, the respondent went through some unexpected happenings that were initiated by traveler’s CS hosts. CS hosts spent their time with Nikita, showed him around and, consequently increased his overall trip experience. However, another aspect that the traveler learned – his dependence on CS hosts as, for example, he did not experience night life of Gothenburg because his CS hosts were in a different age range than him. The respondent said that he would do more couchsurfing trips, however he admitted that one has to have time for it, as CS experience is spontaneous and unpredictable. Thus, Nikita’s trip carries both Reinforcing and Punishing feedback as the traveler will continue couchsurfing, however he will alter his preparations and expectations about trips (Martin & Morich, 2011).
Animals, particularly domestic animals, are important reservoirs and sources of diseases to humans. Salmonella species are normally found in the intestinal tract of animals such as poultry and cattle. When humans ingest contaminated food, the salmonellae can cause disease called Salmonellosis. In terms of animal disease transmission, humans often represent a dead end because the disease cannot be transferred from human to human. Salmonellosis may be acquired from animals, but the infected human can also serve as a source of disease to other humans.
Problems with old-to-new, character, AND linking words?

Handout:

Revise this paragraph so that the topic is clearer and create a balance between character repetition, old-new information structure, and linking words where needed.
Animals, particularly domestic animals, are important reservoirs and sources of disease to humans. *Salmonella* species are normally found in the intestinal tract of animals such as poultry and cattle. When humans ingest contaminated food, the *salmonellae* can cause disease called *Salmonellosis*. In terms of animal disease transmission, humans often represent a dead end because the disease cannot be transferred from human to human. *Salmonellosis* may be acquired from animals, but the infected human can also serve as a source of disease to other humans.
Animals, particularly domestic animals, are important reservoirs and sources of disease to humans. Animals such as poultry and cattle, for example, often carry *Salmonella* species in their intestinal tracts. When these animals become contaminated food for humans, the salmonellae can cause disease called Salmonellosis. Although humans often represent a dead end for animals disease transmission, a human infected with Salmonellosis can serve as a source of disease to other humans.
Revision → to re-see
See the big picture

Print out your text!
Focus on the introductions

to the whole text
to the major sections
to the subsections
to long paragraphs

1. Underline the point/topic
2. Circle keywords/concepts in the point sentence
3. Trace the development of those concepts
1. Number your paragraphs.
2. Identify the topic of each paragraph.
   a. Is there a recognizable topic sentence?
   b. How long is the paragraph?
      i. Does the topic seem sufficiently developed?
      ii. Is there more than one topic in the paragraph?
3. Arrange these topics in an outline.
4. Analyze this outline, assessing the logic (where elements have been placed in relation to one another) and the proportion (how much space is being devoted to each element).
5. Use this analysis to create a revised outline.
6. Use this revised outline to reorganize your text.
7. Go back to your answers in 2a and 2b to help you create topic sentences and coherence in your paragraphs.

See Explorations of style
Compare intro & conclusion

**Introduction**
Blah blah blah blah blah Blah blah blah blah Blah blah blah blah Blah blah blah blah Blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah

**Conclusion**
Blah blah blah blah blah Blah blah blah blah Blah blah blah blah Blah blah blah blah Blah blah blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah
Blah blah blah blah Blah blah

Are the expectations you set up in your introduction mirrored in your conclusion?
Create a topic sentence paragraph

1. Identify every paragraph’s topic/point sentence.
2. Copy and paste these sentences into a separate document to create a “pseudo-paragraph.”
3. This paragraph won’t flow very well, and will be really long, but it should be globally coherent.
4. Often works best as a confirmation that you have a coherent text and are ready to move on to local level revision.

See Explorations of style
Diagnose & Revise Paragraphs

1. Underline the first 6 or 7 words of sentence.
2. Is there something in those words that connects to the previous sentence?
3. If not, is it because the main character is repeated instead? (often you will refer to the previous sentence and repeat a character simultaneously)
4. Do you rely on a linking word to fake a transition?
5. Revise so that the first 6 or 7 words refer to familiar information, either an idea from the previous sentence and/or a character.

Modified slightly from Williams, Style: Lessons in Clarity and Grace & Booth, et al, The Craft of Research
Remember!

Degree to which errors bother readers

- Word choice
- Word location
- Sentence structure
- Sentence location
- Paragraph structure
- Paragraph location
- Section structure
- Section location

Bothers little

Bothers a lot

From Scientific Writing and Communication (Hofmann)