GOALS FOR WRITING IN CODERS

- Apply write to learn strategies to scaffold the development, application, and mastery of computer science and STEM concepts

- Explicitly teach appropriate writing strategies using a Model-Practice-Reflect instructional cycle

GOALS FOR TODAY

- Get everybody on the same page
- Learn how to model writing
- Participate in writing
- Begin to think about how to integrate these strategies into your own modules

PURPOSE
Use writing as a way to think, observe, describe. Writing helps learning and you don't have to be an "English" teacher or a "writing" teacher to integrate writing into all fields. Use writing to learn. Describe items that are in front of you. Write to understand what you are thinking. Write to make predictions.
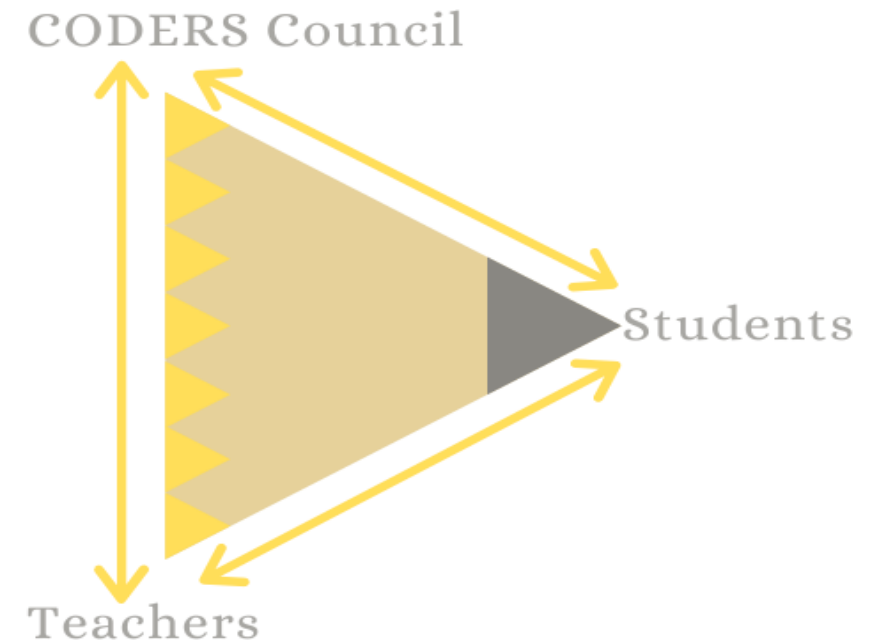
NON-PURPOSE
To focus on the punctuation and grammar part of writing. Grade all writing formally.
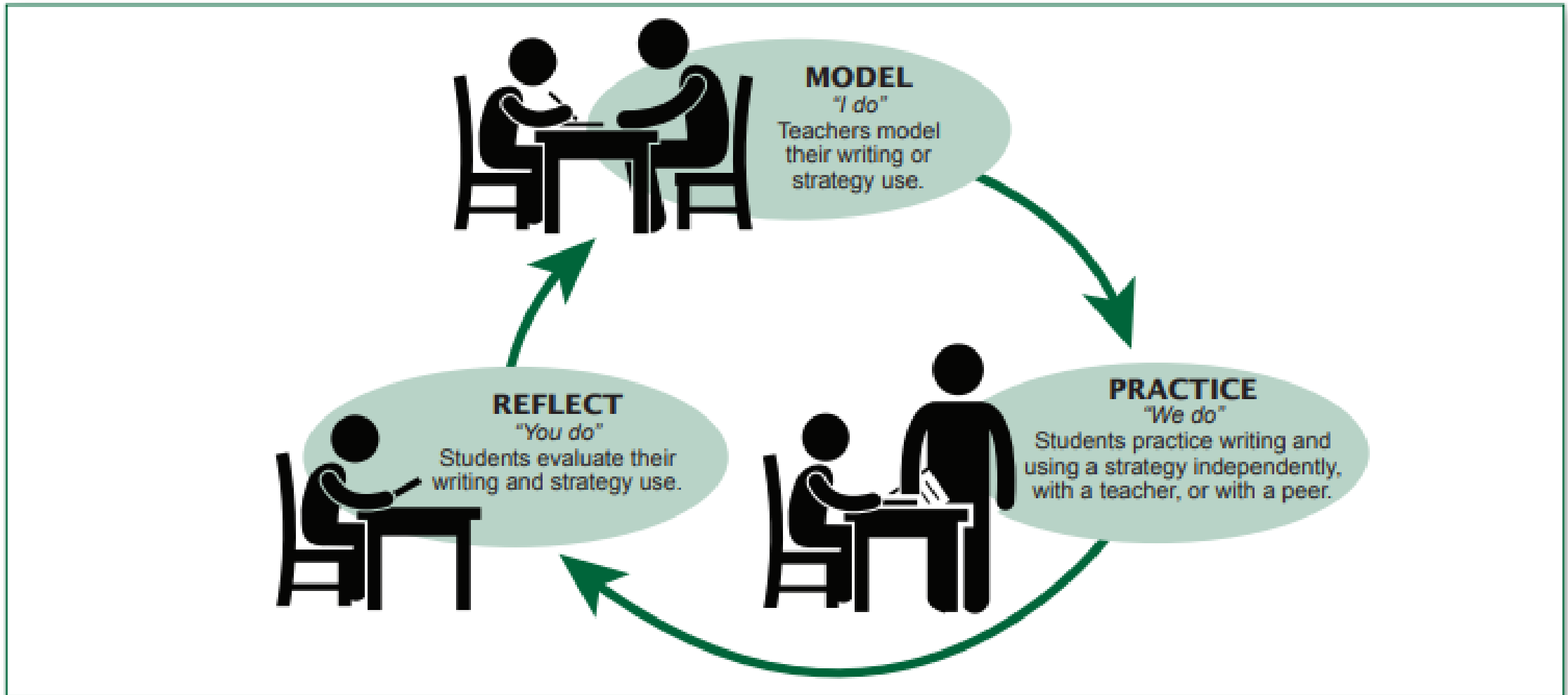
Freewriting...

- Can move from topic to topic
- Is non-stop writing
- Is writing more than you think you can
- Is not sensored; that means don't worry about spelling, grammar, and mechanics
- Is not worrying about how good the writing is
- Is keeping your pen on the paper and writing even if you don't know what to say
- Is writing that is not judged or graded
- Is a way to explore
- Is a way to improve thinking
- Builds fluidity

MODEL-PRACTICE-REFLECT—INSTRUCTIONAL CYCLE

- Teaching method used to increase comprehension & confidence

- In addition to KWL, we're using a Model-Practice-Reflect instructional cycle.
    - I do
    - We do
    - You do

- Allows students to see you're not asking them to do something you won't do.

- 11 studies show Model-Practice-Reflect as having strong evidence

CODERS Council

Students

Teachers

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MODEL-PRACTICE-REFLECT TO TEACH WRITING STRATEGIES

MODEL
"I do"
Teachers model their writing or strategy use.

PRACTICE
"We do"
Students practice writing and using a strategy independently, with a teacher, or with a peer.

REFLECT
"You do"
Students evaluate their writing and strategy use.

Graham, S., Bollinger, A., Olson, C. B., D'Aoust, C., MacArthur, C., McCutchen, D., & Olinghouse, N. (2012). Teaching Elementary School Students to Be Effective Writers: A Practice Guide. NCEE 2012-4058. *What Works Clearinghouse*.

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EXAMPLE 1.4.

Questions for understanding the target audience

- Who is my audience?
- What does my audience already know or understand about this topic?
- What does my audience need to know?
- What type of information or argument would my audience respond to?

- What visual media might help me to persuade my audience?
- Where in my writing might the audience be misled?

UNDERSTANDING AUDIENCE

QUESTIONS FOR UNDERSTANDING PURPOSE

- What are the aspects of effective writing for this purpose?

- What are my goals for this writing assignment?

- Is the purpose to reflect, explain, summarize or analyze?

Graham, S., Bollinger, A., Olson, C. B., D'Aoust, C., MacArthur, C., McCutchen, D., & Olinghouse, N. (2012). Teaching Elementary School Students to Be Effective Writers: A Practice Guide. NCEE 2012-4058. *What Works Clearinghouse.*

Writing prompt: Evaluate an informative essay that you completed this semester. Use the *Compare-Diagnose-Operate* strategy to evaluate the essay

Read through your paper and ask if any of the following apply (Compare):
- The main topic of my paper is unclear.
- I present too few ideas on the topic.
- Part of my paper goes off topic.
- I don't provide enough information about some ideas.

Next, decide how you will rectify each issue identified (Diagnose) and implement your revision (Operate).

EVALUATING INFORMATIVE WRITING

Graham, S., Bollinger, A., Olson, C. B., D'Aoust, C., MacArthur, C., McCutchen, D., & Olinghouse, N. (2012). Teaching Elementary School Students to Be Effective Writers: A Practice Guide. NCEE 2012-4058. *What Works Clearinghouse*.

EXAMPLE 1.11.

Model-Practice-Reflect using book club blogs[46]

Create an online blog space for students to post written content about books they have read and comment on other students' blog posts. Students should follow a set of guidelines, established by the teacher and/or agreed upon by the class, when commenting on other students' blog posts (see below for sample guidelines).

Model for students how to write a blog post that summarizes and analyzes a book of your choice. Distribute blog posts from past students for the class to read and evaluate. Additionally, model for students how to comment on another student's blog post, incorporating the commenting guidelines.

Students can practice writing blog posts throughout the year. As students become more proficient at writing summaries, the blog posts can take other forms (such as reflective writing or argumentative writing) or focus on other objectives (such as summarizing or evaluating the use of writing strategies). As students improve their blog posts and comments, highlight particularly effective posts and constructive blog comments each week. Periodically ask students to reflect upon how their writing changed throughout the course of the year based upon the peer and teacher comments they received.

Sample guidelines for commenting on blogs

Comments will receive points according to how complete they are and how well these guidelines have been followed.

1. Comment on what the writer wrote, not on the writer himself or herself.
2. Don't put the writer down, even in a joking way. Humor does not always come across effectively in blog comments.
3. Before submitting a comment, always consider whether you would find that comment constructive if it were left as a comment on your own work.
4. Be specific in your comments. Don't say, "Your post is really good." Instead, refer to something specific that you like about it.
5. Don't focus on the post's grammar and spelling. Focus on ideas and organization instead.
6. Use polite language and **academic vocabulary** in your comments. Follow the rules of grammar and spelling as much as possible.
7. Don't use your comments as an opportunity to show how much smarter you are than the writer of the blog.
8. Avoid the use of "ALL CAPS." It may lead to the reader misunderstanding your tone.

HOW TO IMPLEMENT MODEL-PRACTICE-REFLECT

WRITE TO LEARN STRATEGIES TO CHOOSE FROM

KWL

4-Square

Venn Diagram

Outline

Set goals for writing---explain why we are writing this—set the purpose

SCHEME

WRITE

3-2-1

WIRMI

Job Cards (could use this for activities with prescribed tasks)

PLAN

Haiku

K-W-L

Purpose:

Increase comprehension, Activate prior Knowledge, Help students reflect on and evaluate their learning experience. It is cyclical, we always have more to learn.

Non-Purpose:

Writing just to fill space

We're All Learners

Teachers

Students

CODERS Council

K-W-L

What do you Know?	What do you Want to know?	What do you hope to Learn?

TIPS FOR IMPLEMENTING WRITE TO LEARN STRATEGIES

- You will have to re-teach and give the purpose/non-purpose each time
  - You might laminate a copy of the strategies and their steps to have at each student's desk
- Give students choices of writing strategies; they're not one-size-fits all
- Ask students, "How have you been using strategies?"

- Break down the writing into manageable steps
- Write the assignments you ask them to write—write along with them
- Don't call on students, instead, have them share with a partner
- Give low-stakes opportunities to write and share
  - Practice listening without responding

HOW TO IMPLEMENT EXPLORATORY WRITING INTO YOUR COURSE

- In-class writing
- Out-of-class journals, thinking pieces, blogs, etc.
- Reading journals or logs
- Creativity exercises
- Intervention tasks for formal assignments
- Low-stakes exercises

Bean, J. C. (2011). Engaging Ideas: *The Professors Guide to Integration Writing, Critical Thinking, and Active Learning in the Classroom Second Edition.* Jossey-Bass.

Why is observational and descriptive writing so important to science?

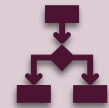# DESCRIPTIVE SCIENCE WRITING

NON-FICTION WRITING

Informational writing

What kind of writing do scientists and cs's do?

Lab journals

Lab notebooks

Share the results with others.

In computer science, write the steps—what you want the "thing" to do.

MONOLOGUES AND WRITING CODE OR THINKING ALOUD IN WRITING

- Start with monologue

- "If I do this...then this happens...."

- Move to dialogue

- Integrate with Razib's Alice and Scratch lessons

- Brainstorm ideas about what your character will do in your story.

- Write a task list/script of what you'll need to include to make your character do/move how you want.

Moffett, J., Wagner, B. J. (1992). Student Centered Language Arts: Fourth Edition. Boynton/Cook Publishers Inc.

UNDERSTANDING LOCAL CONTEXT

- Write us a letter about STEM and/or CS jobs in your local community.

- Use this as an assessment tool.
  - Teachers ➡ CODERS Council
  - Students ➡ Teachers

END GOAL: FLEXIBLE PROBLEM SOLVING THROUGH SCIENTIFIC WRITING

- How do scientists come at a problem?
  - Observe and describe the problem
  - Make a prediction
  - Conduct an experiment
  - Observe and reflect on the results
- How can you apply this process to other problems?

FOUR-SQUARE

As a result of
my participation
today, here are...

ideas I've gained:	insights I have about what helped me learn, process, and/or fully participate:
suggestions I have for how to make the work stronger tomorrow:	questions I have:

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WHAT WRITING INTEGRATION IN STEAM LOOKS LIKE?

STEAM =
SCIENCE, TECHNOLOGY, ENGINEERING, ARTS AND MATHEMATICS

You're going to write at the beginning, middle, & end.

You'll learn about some of the types of writing we're asking you to do with your students.

Interactive

LOOKING AT STUDENT WRITING IN STEM

- Modeling how to share writing as a mode of thinking, not grading for grammar and punctuation.
- "A glimpse of the mind at work..." (Odell, year).

Who was present	I/We looked at these pieces of work:
What I/we saw or noticed:	The work raised these questions for us:
We believed the student was working on	What we discovered about the students and their understanding of coding/STEM