# Supporting IBL with alternative grading

David Clark & Robert Talbert

Resource page:
http://gvsu.edu/s/2rF

# Who are we?

**David Clark**
Associate Professor,
**Grand Valley State University***

- 17 years teaching experience
- IBL across classes: Team activities, student presentations, guided inquiry
- Favorite IBL class: Euclidean Geometry for pre-service teachers

**Robert Talbert**
Professor,
Grand Valley State University

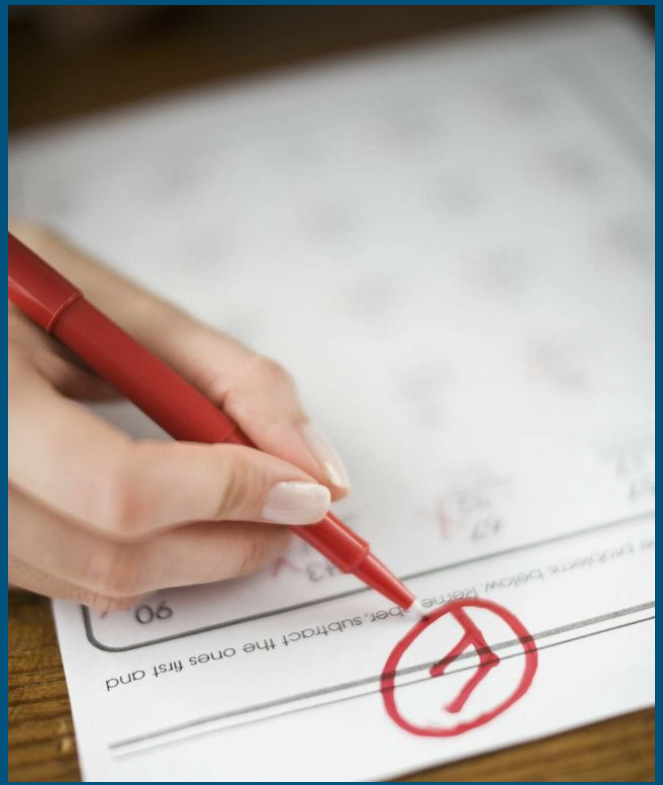
- 26 years teaching experience
- IBL-adjacent teaching practices including flipped instruction
- Favorite IBL-ish class: Discrete Structures for Computer Science

# Why alternative grading?

IBL centers **productive struggle**, **feedback**, and **growth**.

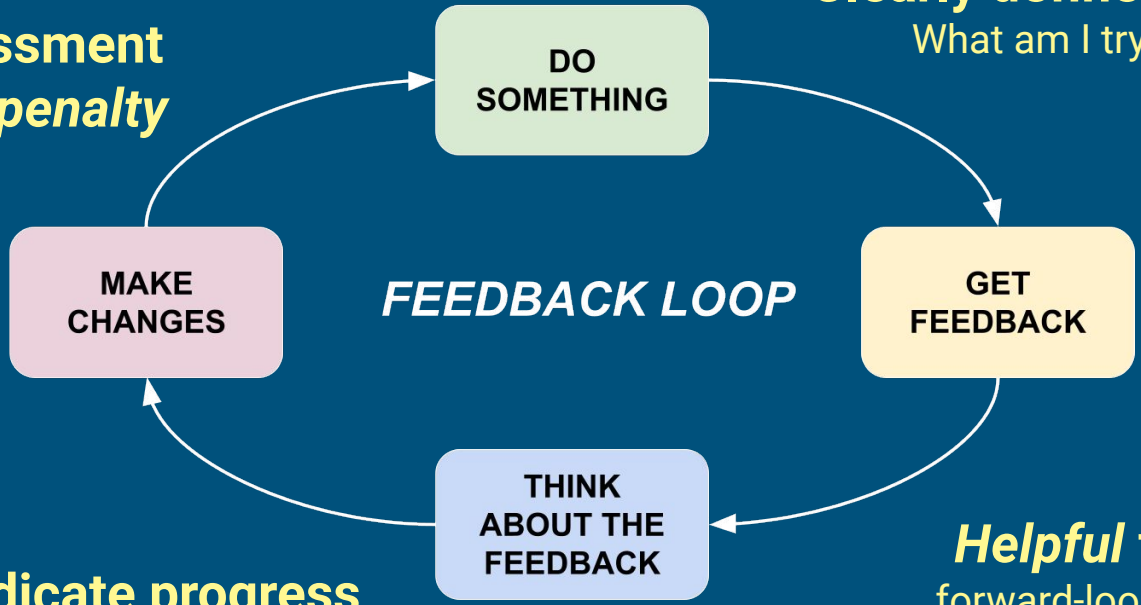
But grading practices can send a mixed message:

- One-and-done assignments
- Permanent averaging
- Compliance-focused policies



**Clearly defined standards**
What am I trying to do?

**Reassessment**
***without penalty***




***Helpful* feedback**
forward-looking, in terms of standards

**Marks that indicate progress**
towards meeting the standards

# The pillars in practice: Discrete Structures for Computer Science 1

# 4 pillars in practice: Clearly defined standards

## Appendix A: Learning Targets

The Learning Targets labeled **CORE** are the CORE Learning Targets. (Those are Learning Targets 2, 3, 6, 7, 8, 9, 12, and 13.)

1. I can convert a positive integer from base 10 to base 2, 8, and 16 and vice versa and represent a negative integer in base 2 using two's complement notation.
2. (**CORE**) I can add, subtract, multiply, and divide positive integers in base 2.
3. (**CORE**) I can identify the hypothesis and conclusion of a conditional statement and state its converse, contrapositive, inverse, and negation.
4. I can construct truth tables for propositions involving two or three atomic propositions and use truth tables to determine if two propositions are logically equivalent.

# Example of a checkpoint

## Learning Target 6

> (**CORE**) I can determine elements of a recursively-defined sequence using a recurrence relation and derive a recurrence relation for a recursively-defined sequence.

Standard explicitly stated

1. Consider the sequence of numbers $a_n$ given by the recursive formula $a_0 = 4$, and for $n \geq 1$, $a_n = a_{n-1} + n^2$. Find the values of $a_1, a_2, a_3, a_4$ and $a_5$. Show your work on each calculation.
2. Consider the sequence of numbers: $2, 10, 50, 250, 1250 \ldots$. If $a_0 = 2$, give a recurrence relation that generates the rest of the sequence. (Do *not* give a closed formula, but a recursive definition. The base case is $a_0 = 2$.)

**Success criteria:** On the first part, the recursive formula must be used correctly with the correct base cases, and the mathematical work leading to the answers must be shown. On the second part, the recurrence relation must be recursive (not a closed formula) and correctly generate the terms of the sequence. No "work" is required on the second part. No more than two simple errors are allowed total.

Criteria for success also explicitly stated

# 4 pillars in practice: Helpful feedback

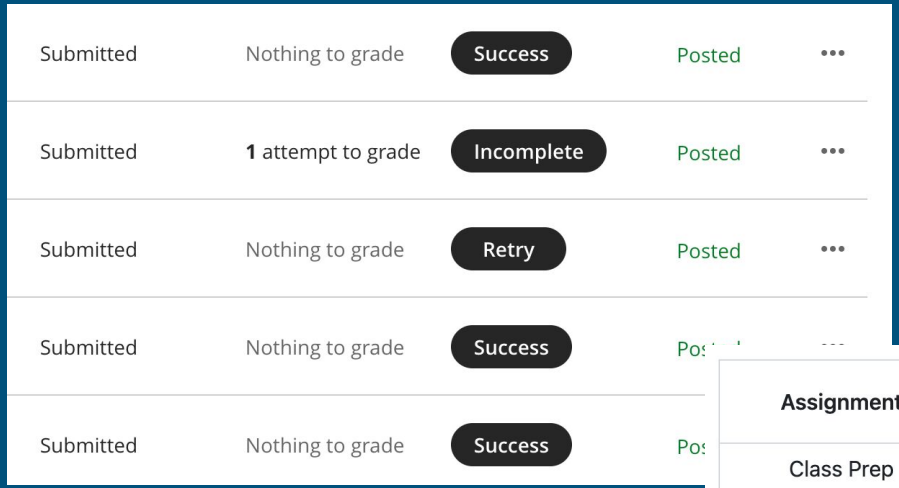
Task 5:

**Why XORing works:** I believe XOR works every time as a way to encrypt and decrypt messages because of the reason that XORing affects 1 bit/digit at a time. Since it can only change a single digit and with there only being two options for a bit, it allows for the key and XOR technique to transform the plaintext into a set ciphertext. Since XOR encrypts each bit in a way that changes it to be either a 1 or 0, decrypting it while using the same key results in a set change to be made to that bit. Bascilly if 1 xor 0 = 1, than 0 xor 1 has to equal 1. Same with 0 xor 0 = 0 and 1 xor 1 = 0. formula to help explain this would be A xor B = C and C xor B = A

**Overall Feedback**

This looks mostly very good, so nice job. I'd like you to try again on the last item (5). Try to be very specific when explaining why the process of decryption always works. Just because there is only one result when encrypting, it doesn't mean that the decryption process described in the assignment automatically works. Look at the specific math that takes place; maybe play with some examples first.

# 4 pillars in practice: Marks indicate progress




[Standards for Student Work document](#) **(also linked on resource page)**

| Assignment | Basis for grading | What's recorded on Blackboard |
|---|---|---|
| Class Prep | Completeness and effort only | *Success* or *Incomplete* |
| Problems on Checkpoints | Overall correctness | *Level 2*, *Level 1*, or *Nothing Yet* |
| AEPs | Completeness, overall correctness, writing, and presentation | *Success*, *Retry*, or *Incomplete* |

# 4 pillars in practice: Reattempts without penalty

## Appendix B: Schedule of Checkpoint coverage

Here is an initial schedule of which Learning Targets are covered on which Checkpoints, and when those will occur. This schedule may change during the semester, in which case you will be notified; the Course Calendar (below) is always assumed to be right in case of apparent date conflicts.

| Checkpoint | Date | Learning Targets included |
|---|---|---|
| 1 | 9/13 | 1, 2 |
| 2 | 9/20 | 1, 2, 3, 4 |
| 3 | 9/27 | 1, 2, 3, 4, 5 |
| 4 | 10/4 | 2, 3, 4, 5, 6, 7 |
| 5 | 10/11 | 2, 3, 5, 6, 7, 8, 9 |
| 6 | 10/18 | 2, 3, 6, 7, 8, 9, 10, 11 |
| 7 | 10/25 | 2, 3, 6, 7, 8, 9, 10, 11, 12, 13 |
| 8 | 11/1 | 2, 3, 6, 7, 8, 9, 10, 11, 12, 13 |
| 9 | 11/8 | 2, 3, 6, 7, 8, 9, 12, 13 |
| 10 | 11/15 | 2, 3, 6, 7, 8, 9, 12, 13, 14 |
| 11 | 11/20 (Monday) | 1-15 |
| 12 | 11/29 | 2, 3, 6, 7, 8, 9, 12, 13, 14, 15 |
| 13 | 12/4 (Monday) | 1-15 |
| Final exam | 12/13 | 1-15 |

# How course grades are determined

## Course Grades

**Refers to number of successful attempts on Checkpoint problems for that Learning Target**

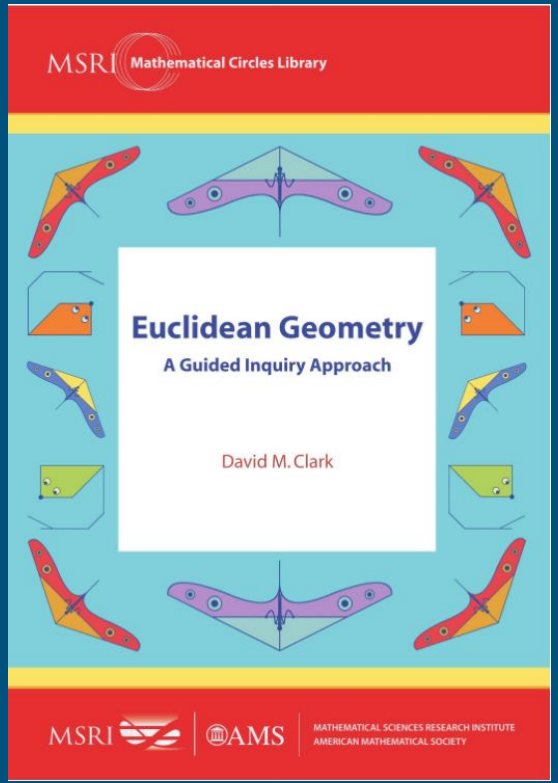
Your course grade is assigned using the table below. It shows the requirements for the "base grade" of A, B, C, or D; criteria for plus/minus grades are shown below the table. The numbers in the table refer to the number of **Success** marks on each item. **To earn a grade, complete ALL the requirements listed in the row for that grade.**

| Grade | Class Preps (out of 25) | Learning Targets at Level 1 | Learning Targets at Level 2 | AEPs (out of 8) |
|---|---|---|---|---|
| A | 20 | All 8 Core + 6 others | All 8 Core + 4 others | 6 |
| B | 18 | All 8 Core + 4 others | All 8 Core + 2 others | 4 |
| C | 16 | All 8 Core + 2 others | All 8 Core | 2 |
| D | 10 | Any 8 | 0 | 0 |

A grade of "F" is earned if not all of the requirements for a "D" are met.

# Where this can go: IBL Euclidean Geometry

- Euclidean Geometry for future teachers
- Junior-Senior, 10-20 students per section
- Guided inquiry
- Attempt problems before class, present, discuss, collaborate, use remaining time for problem solving



# Where this can go: “Ungrading”

- Reduce/remove assignment grades
  - Focus on feedback
  - Remove grade incentives
- Periodic check-in meetings
- Final grades based on narrative descriptions & portfolio
- *May* involve self-assessment

**To earn a C, be a good class citizen and show a solid understanding of key geometric ideas.**

*Here are some ways to be a good class citizen – you can propose others:* Complete all work with genuine effort (e.g. daily prep, homework, check-ins, etc.); attend class regularly and actively seek out resources to catch up if you miss class; actively participate in class discussion and activities; be a supportive and conscientious teammate.

*To show solid understanding of key geometric ideas:* In your portfolio, include artifacts that demonstrate your understanding of *at least 4* of these ideas:

- Perpendiculars and Right angles
- Parallels and Axiom 5
- Triangle congruences
- Proof by Contradiction
- Area and/or Angles
- What definitions and axioms are, where they come from, and why they’re important.

# Where this can go: “Direction for growth”

- Explicitly value *growth* in addition to *learning*
- Short- and long-term goals, check-in meetings, reflections

**To earn an A, show significant growth in a new direction.**

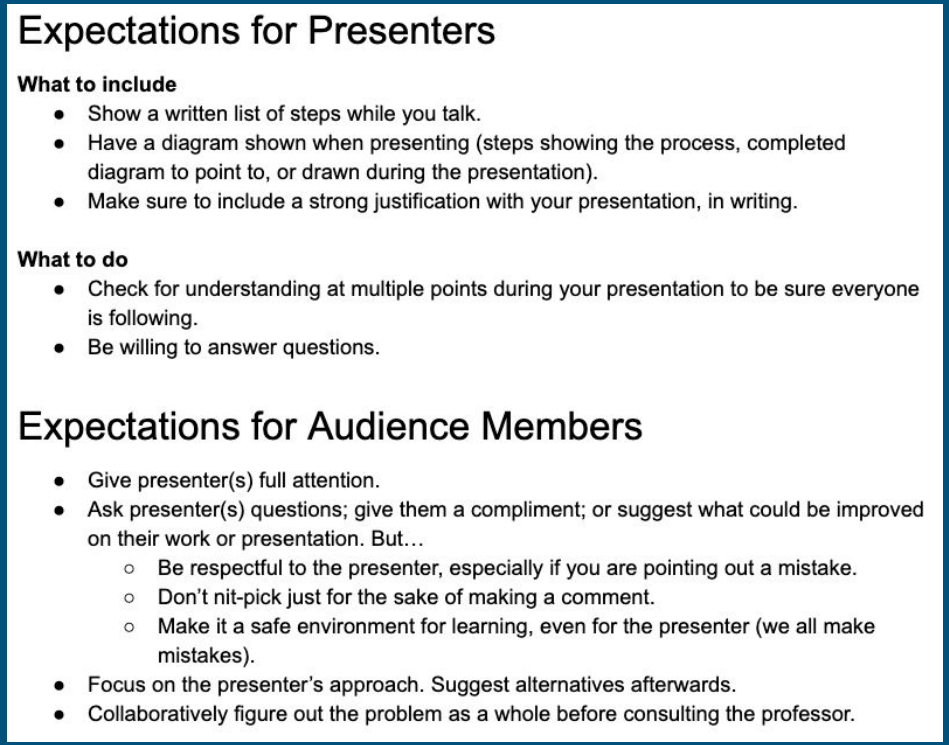
*At the start of the semester, you’ll choose to focus on **one** of these directions for growth.*

- **Excellent writing:** Learn to write *excellent* solutions that show thorough understanding of geometric ideas, as well as professional communication, writing style, and formatting. This involves attention to detail and careful thought for your audience. This can be done through homework and the class journal.
- **Excellent presenting:** Think like a teacher as you prepare and share your ideas and answer questions. Create well-prepared, carefully-thought-out, correct presentations that help your classmates understand your ideas.

Your goal is to show *significant growth* above where you started. That doesn’t mean you need to be an expert: In your portfolio, you will show how you’ve *improved* in your area of focus. During this process, you’ll likely feel uncomfortable, and that can be hard! You’ll have the support of me and your classmates as you work towards your goal.

# Where this can go: Co-created rubrics

- Students provide input based on their experiences & goals
- Useful for presentations and participation
- Usually self- or co-assessed



## Expectations for Presenters

**What to include**

- Show a written list of steps while you talk.
- Have a diagram shown when presenting (steps showing the process, completed diagram to point to, or drawn during the presentation).
- Make sure to include a strong justification with your presentation, in writing.

**What to do**

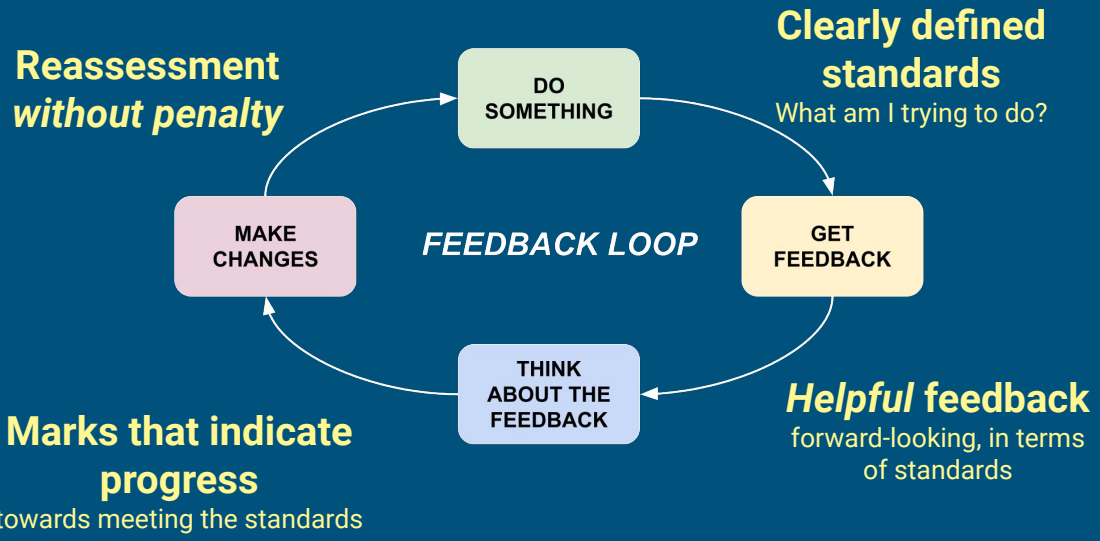
- Check for understanding at multiple points during your presentation to be sure everyone is following.
- Be willing to answer questions.

## Expectations for Audience Members

- Give presenter(s) full attention.
- Ask presenter(s) questions; give them a compliment; or suggest what could be improved on their work or presentation. But…
    - Be respectful to the presenter, especially if you are pointing out a mistake.
    - Don't nit-pick just for the sake of making a comment.
    - Make it a safe environment for learning, even for the presenter (we all make mistakes).
- Focus on the presenter's approach. Suggest alternatives afterwards.
- Collaboratively figure out the problem as a whole before consulting the professor.

# Should I do *all the things?*

- **Keep it simple**
- Find what works for you
- Trust yourself
  and your students



**New book!**
See link on the resource page

Blog:
http://gradingforgrowth.com

Resource page:
http://gvsu.edu/s/2rF