Microsoft

# TEALS Summer Training #2
# "Classroom Zen"

<location>
<date>

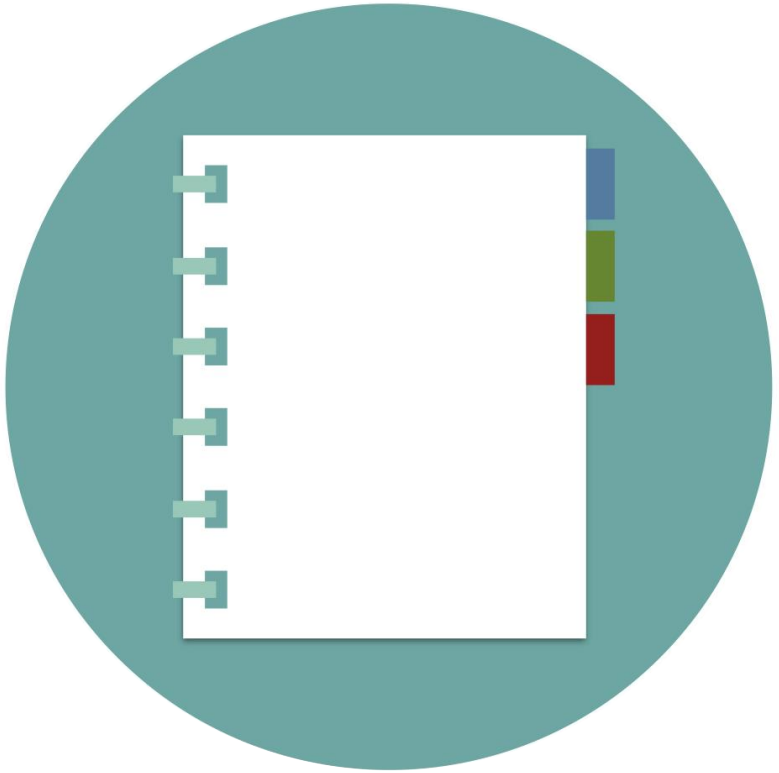
## As you arrive, please…

Put on a nametag

Put your name on an index card and drop into the first box

Put your name on a raffle ticket and drop into the second box

# NOTEBOOKS OUT!



# Review: Sample Lesson

**Activity Packet, Page 3-5**

## TWO TASKS

**Model** the role of an **AP CS A** student

**Look** for elements you recognize from **session 1**

## WHAT...

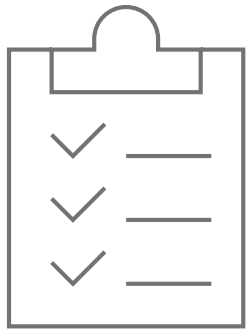
**Structure** does this lesson have

**Instructional Formats** are used

**Questions** are asked

**Other techniques** are used

# More Logistics



Team meetings

School Year Kickoff Event

Volunteer t-shirts, bags, books

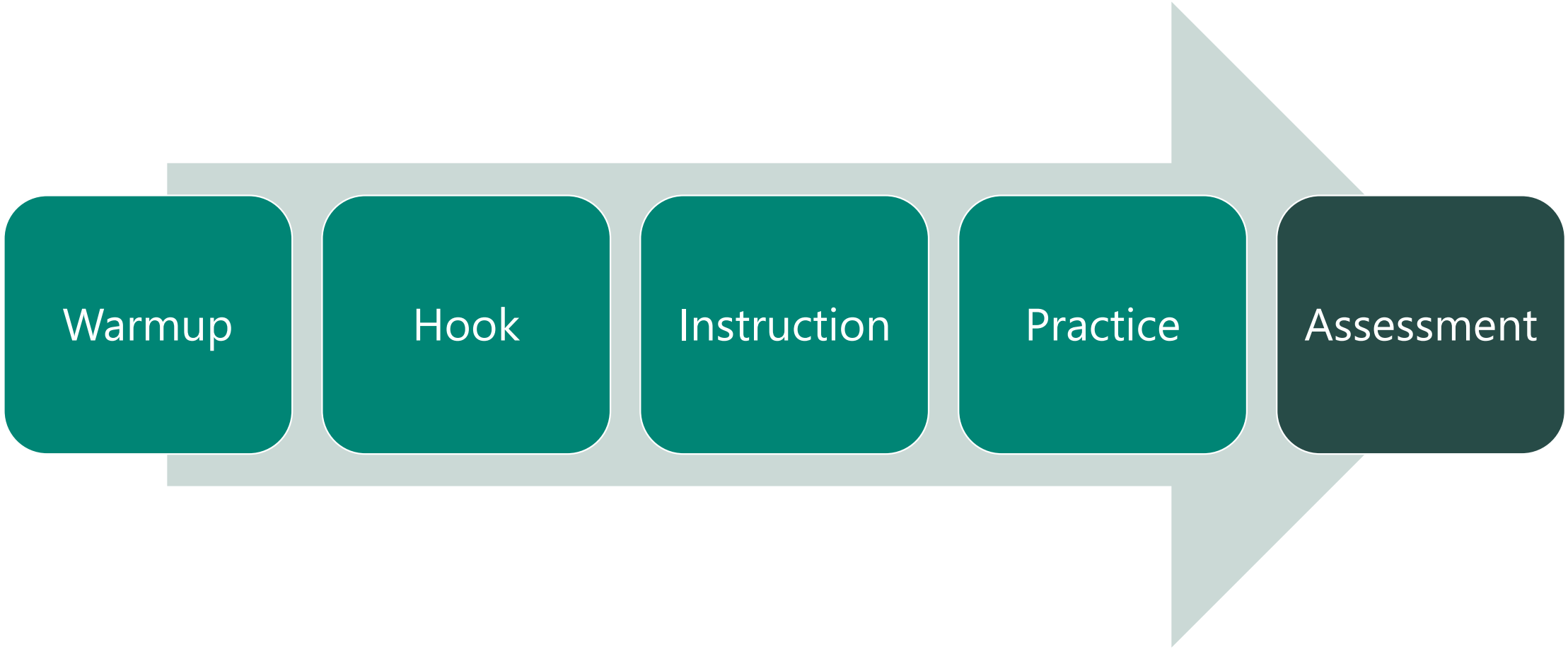
School logistics (background check/IDs/etc.)

Summer RM Check-ins and Mock Lesson

Canvas homework

TEALS Forums

# Anatomy of a Lesson



# Formative Assessment

# Formative Assessment

**[fôrmədiv əˈsesmənt] noun**

*Anything that gives you information about what students are learning and/or how they're doing*

## SHOULD OCCUR FREQUENTLY

*Multiple times per day/lesson*

## AGGREGATE & INDIVIDUAL RESULTS

*Don't make assumptions!*

## ASSESS … THEN REACT!

- *Reteach, work through examples, pull aside a smaller group, if needed, etc.*
- *Help students make connections between current knowledge & new material*
- *Demonstrate their understanding*
- *Celebrate their learning!*

## Question

What’s the most frequent type of formative assessment?

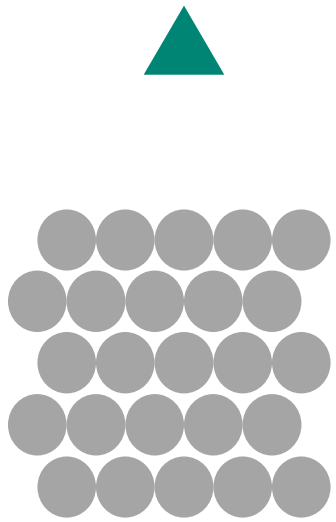
# Checking for Understanding


| | |
|---|---|
| **"OK?"** | "On the count of three, put up 0 fingers if you're lost, 5 fingers if you're bored, or some number in between." |
| **"Right?"** | "Thumbs up if you agree with me, down if you disagree." |
| **"Got it?"** | "Who can explain this concept in their own words?" |

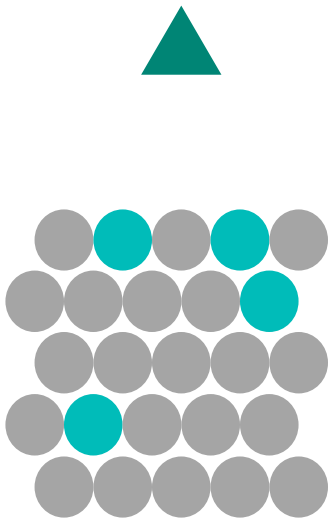
# How to Ask Questions

- Consider the **manner** in which you ask questions, **to whom** you ask them, and **when** you ask them
- Ensure that you are getting formative assessment data about the **whole class** and not just the students who always raise their hands quickly

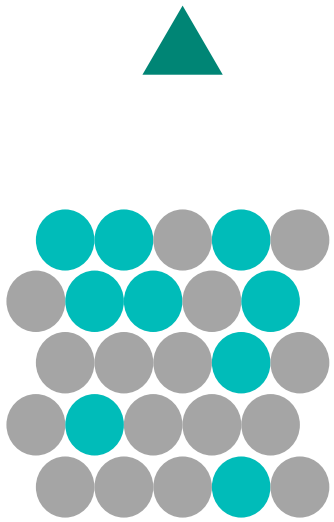
# Wait Time



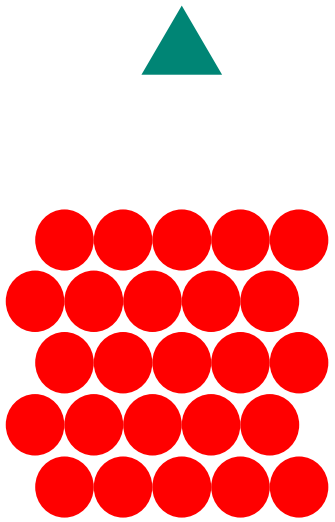
After 0 seconds



After 3 seconds

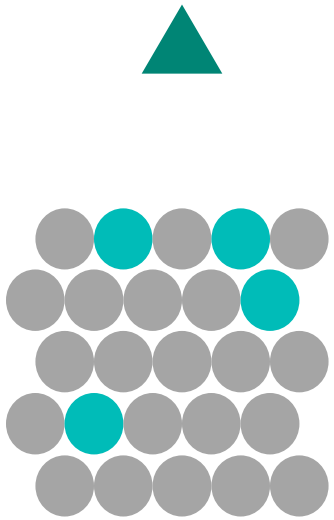


After 10 seconds

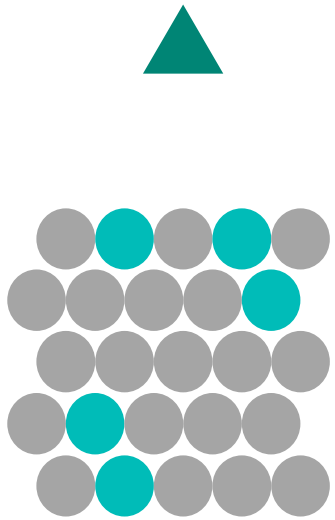


After 30 seconds

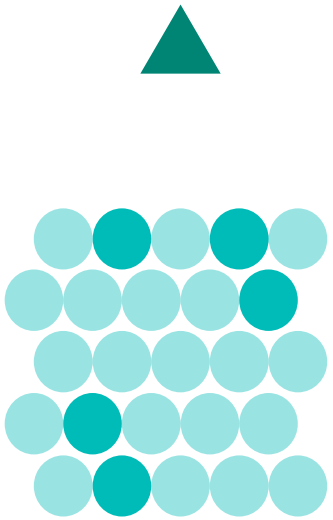
# Cold Call



After question

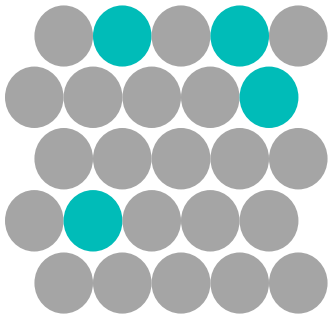


Before question

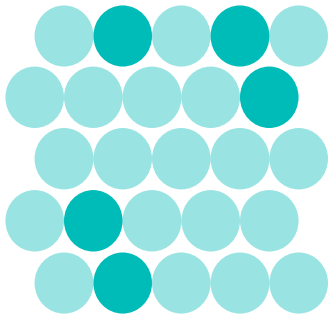


After question, with warning

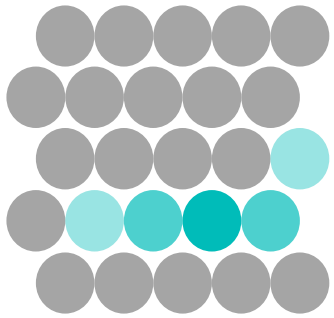
# Questioning Techniques



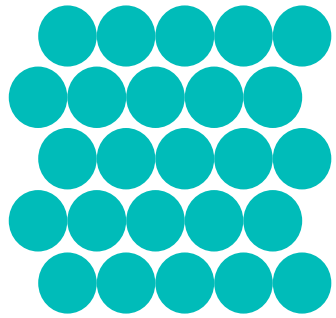
Call on Hands



Fist to five/
Thumbs up



Around the World



Everybody Writes/
Think-Pair-Share

# Formative Assessment Tools

## OFFLINE

- Thumbs up/down/side
- Fist-to-five
- Stoplight cards
- Red cup/green cup

## ONLINE/GAMIFY ASSESSMENT

- Socrative http://www.socrative.com/
- Kahoot! https://getkahoot.com/
- Plicker https://www.plickers.com/

# “Peer Instruction” – An Evidence-Based Approach

## Present a multiple-choice problem

1. Poll
2. Build consensus in groups
3. Poll again
4. Debrief and Discuss

http://www.peerinstruction4cs.org/

# Peer Instruction Demo

**The chance that two people share the same birthday:**

$$1 * \frac{1}{365} = 0.27\%$$

**What's the smallest group size where there is a >50% chance that at least two people share a birthday?**

(no twins, no leap years, even distribution)

# Step 1: Let's Vote!


Navigate to kahoot.it and enter [game pin provided by instructor]

# Step 2: Let's Discuss!

- Get into groups of 3 or 4
- Come to a *consensus* about which one is the correct answer. You must be able to support the answer your group comes up with.
- You have *4 minutes.*

# Step 3: Re-Vote


Navigate to kahoot.it and enter [game pin provided by instructor]

# Step 4: The Explanation

# Recap: Peer Instruction

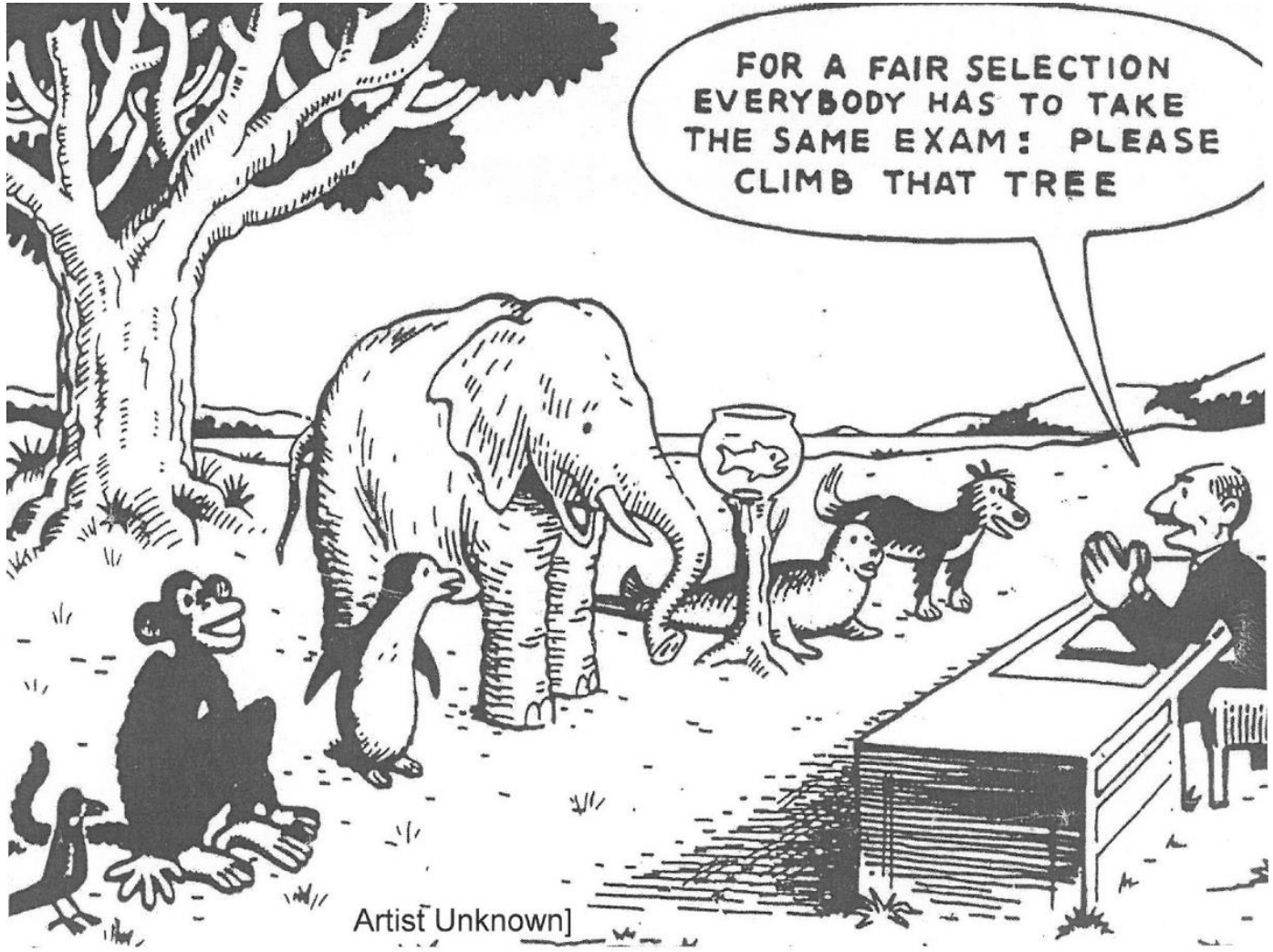
How could you use this technique effectively in the classroom?

What are the pros/cons of using peer instruction?

# Differentiated Instruction

Some kids are ahead, others are behind.
What should I do?

# Differentiated Instruction



# What It Really Means

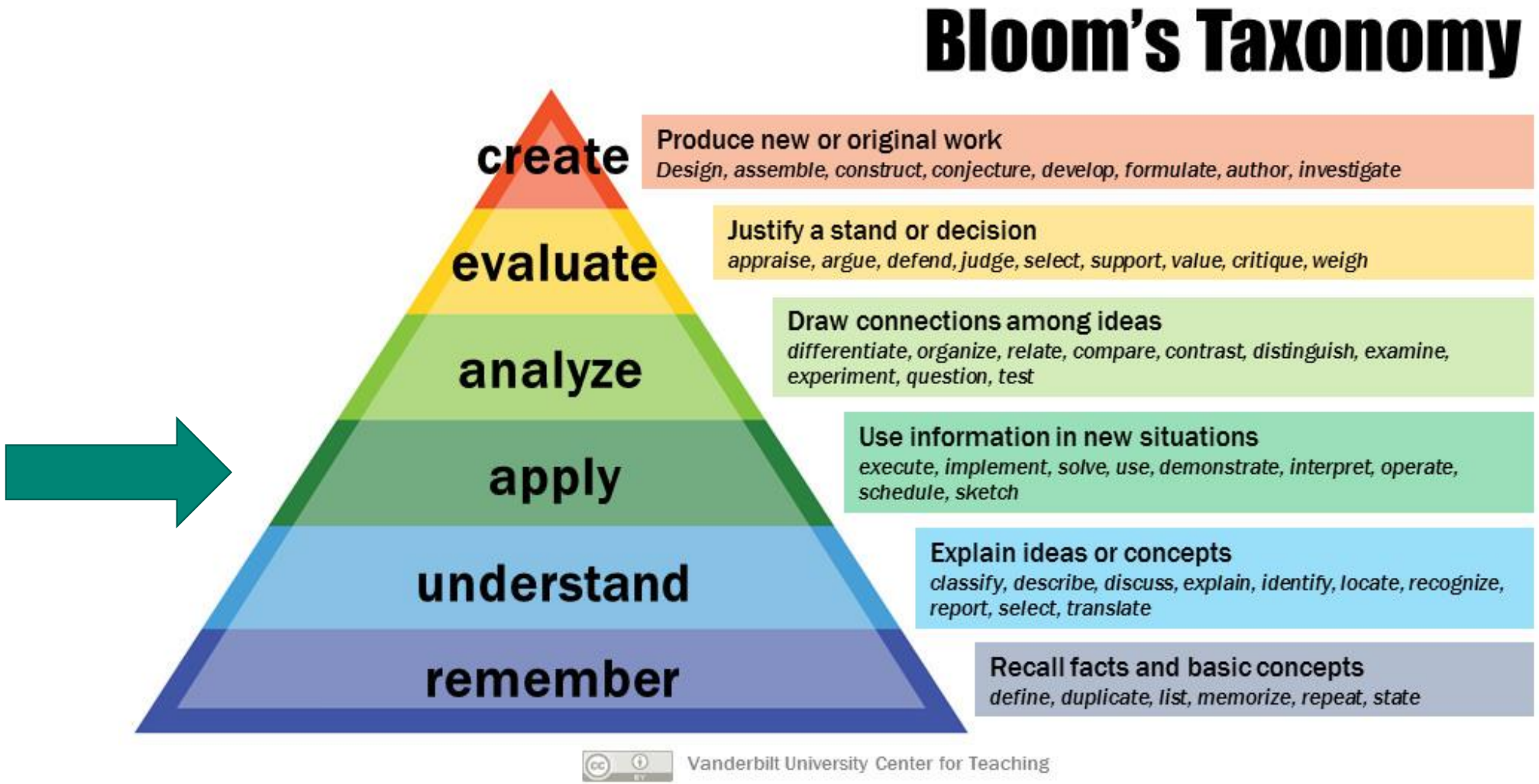
## Differentiated instruction is:

- *Planned*, not an afterthought
- A *value-add*, not a time-killer
- Focused on helping students *grow and learn*, not "catch up" or "slow down"
- Tailored to students' strengths, interests, background, home life, and lived experiences

## Differentiated instruction is NOT:

- Extra or reduced work (without shifting complexity, style, etc.)
- Providing answers when "time is up"

# Differentiating with Bloom's Taxonomy



# Classroom Example

**During lab you find that:**

- 5 students don't understand loops at all
- 15 are handling the lab just fine
- 5 finished the lab in 10 minutes and are now bored

How did you **determine** that this is the situation?

How can you help those students who are **behind?**

How can you help those students who are **ahead?**

What if a particular student is **frequently** ahead or behind?

# Inclusive Assessments

*Options*
*Personalization*
*Student Agency*

# Inclusive Assessment Examples

| Assignment | Assessment Modification Example |
| --- | --- |
| Lab/practice assignments: | Provide several ways to demonstrate understanding of new content:<br>• Exercises using a practice tool<br>• Write a program of your own design that meets a checklist of criteria (I.e. uses methods X, Z, has 10 lines of code)<br>• Creation of posters or songs to review/reinforce new material |
| Tests/HW: | Students select 4 out of 8 of homework or quiz questions. |
| Final Projects/ Presentations | Student work portfolio with documented progress, peer review, frequent feedback and rubrics, student contracts with predetermined learning goals |

# Packet Activity: Practicing Differentiated Instruction

For each type of student, choose the modification that would best support the student.

**You have six minutes.**

# Creating an Inclusive Classroom

# Culturally Responsive Teaching Quiz

*Completed the CRT online module?*
*Let's review!*

1. Visit https://b.socrative.com/login/student/
2. Enter room number:
3. Start the Space Race CRT quiz!

# Fostering An Inclusive Computing Culture

Inclusive Teaching

↓

Culturally Responsive Teaching

↓

Ready for Rigor Framework

- Awareness
- Learning Partnerships
  - Wise feedback
- Information Processing
- Community Building

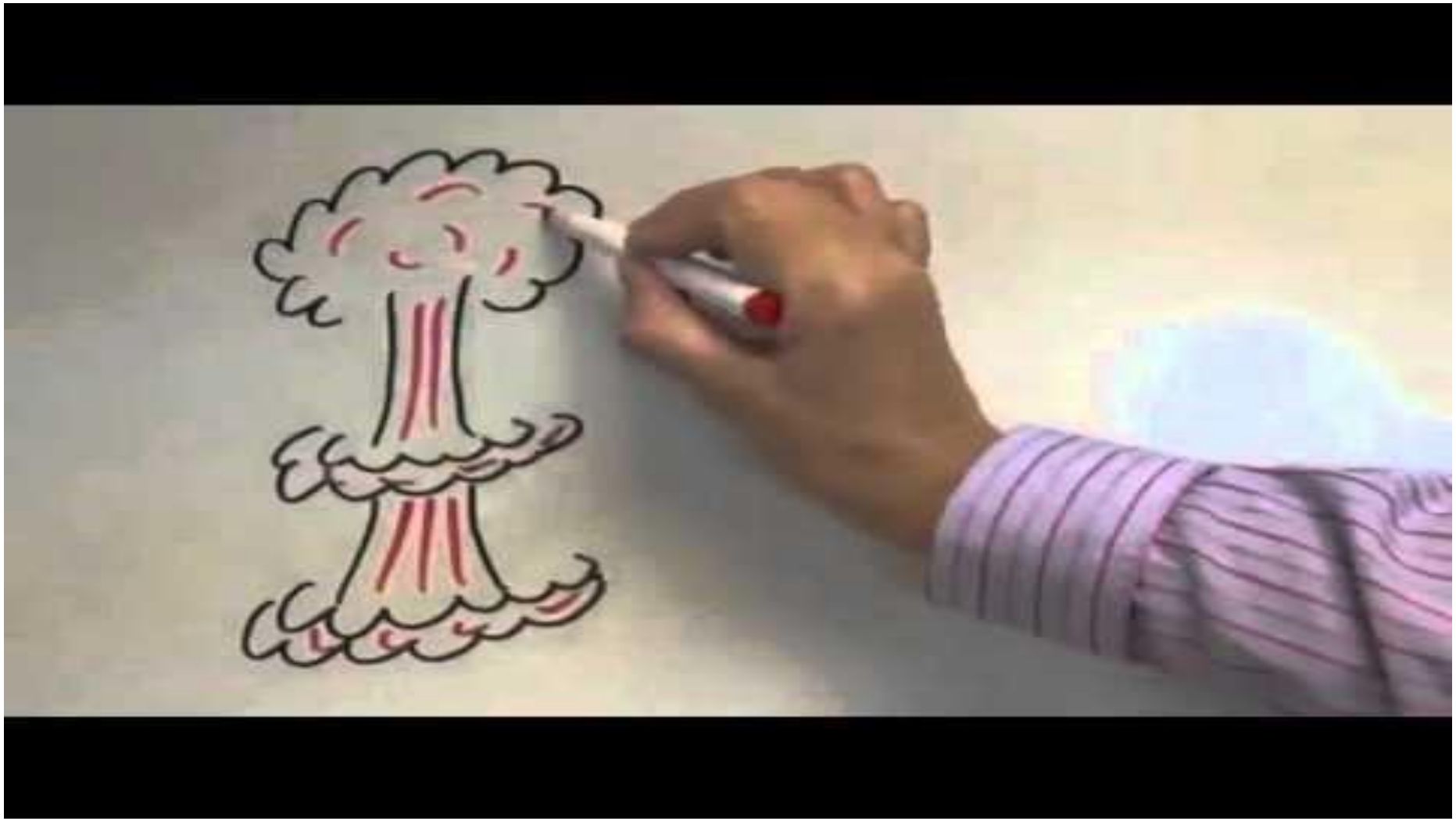
# CRT & the Brain

## Scenario 1

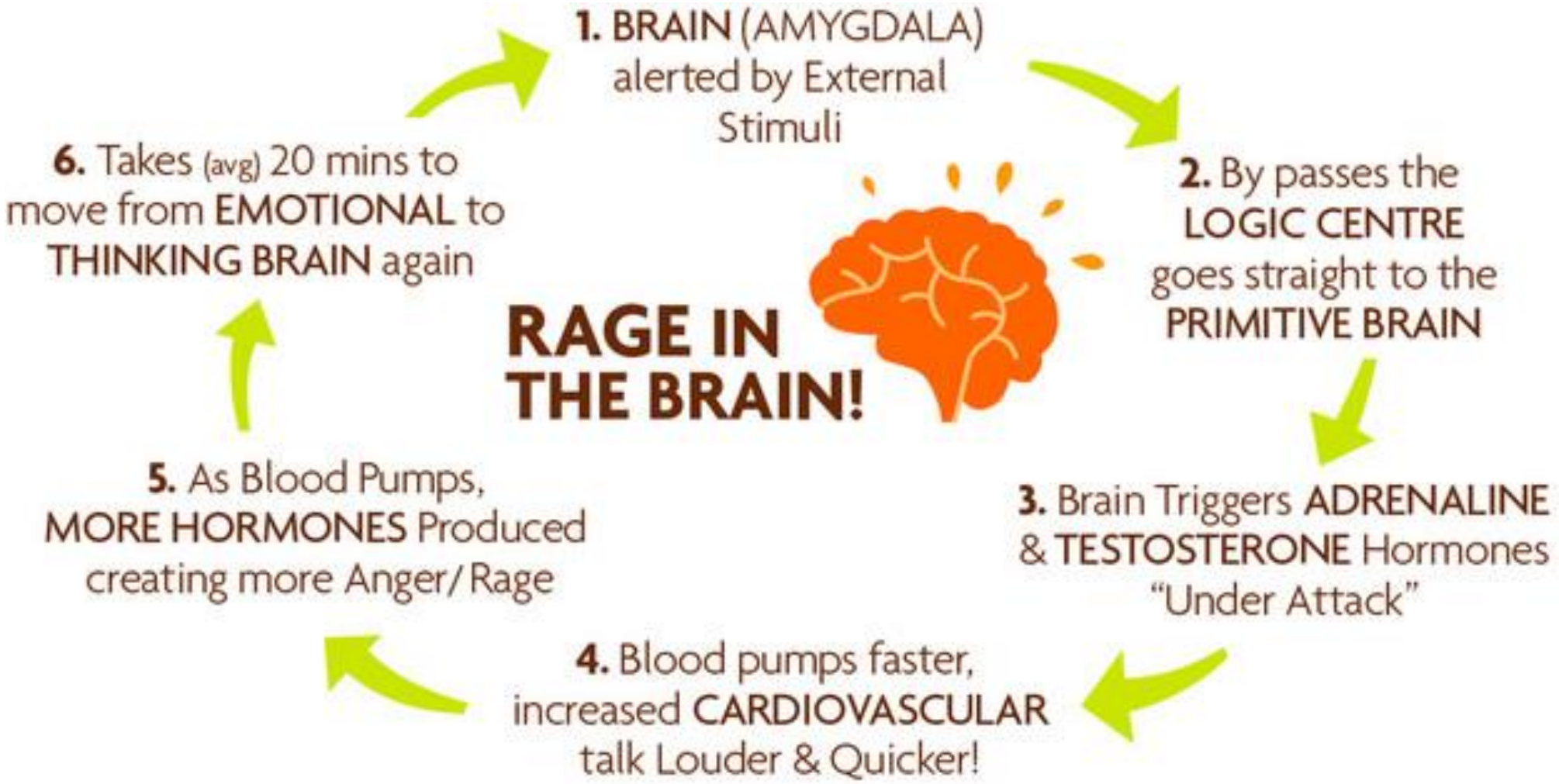
A student was up and out of his seat sharpening his pencil along with other students as the teacher was about to begin the lesson. She got his attention and said "James would you like to take your seat?" James said no and continued to sharpen his pencil. The teacher was outraged and sent James to the principal's office.

**What is happening in this scenario?**

# What is the Amygdala Hijack?



# Amygdala Hijack Process



# 5 Types of Threats

1. Standing
2. Certainty
3. Connections
4. Control
5. Equity

# 1. Threats to One’s Standing

**Fear of diminishing status within a group, or being expelled altogether.**

- Assessments and evaluation (bad grades)
- Comparisons between students
- Praise and criticism

# 2. Threats to One's Sense of Certainty


**Fear of embarrassing oneself or not knowing what to do in a given situation.**

- Struggling with new ideas; shutting down
- Dealing with mistakes and failure
- Cold calling and presenting in front of peers
- Pacing

# 3. Threats to One's Connections

**Fear of being an outsider, being excluded from or losing touch with others, especially from a peer group.**

- Working in groups
- Taking social risks

# 4. Threats to One's Sense of Control

**Fear of being told what to do, where to go, or how to behave, in a manner inconsistent with one's values.**

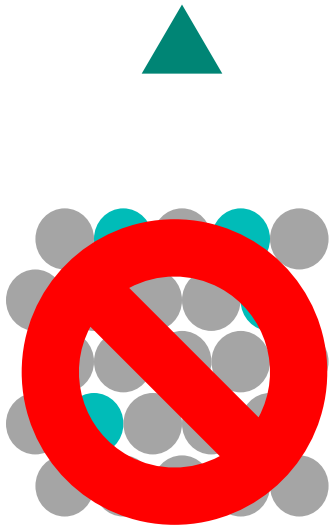
- Giving directions and corrections
- Student choice in work

# 5. Threats to One's Sense of Equity

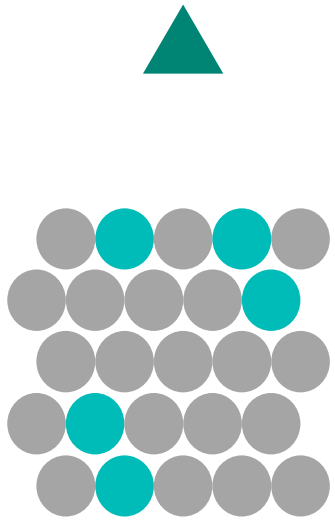
**Feeling treated unfairly *or* Participating in an unfair system.**

- Expectations
- Adaptation
- Perceived favoritism

# Remember the Cold Call?



After question



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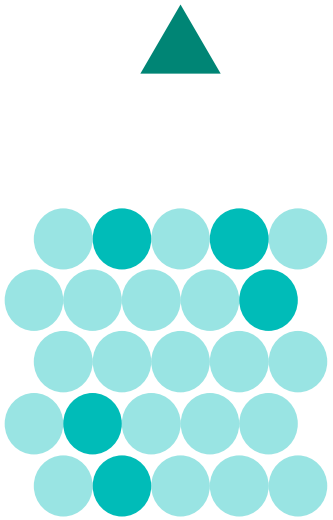


After question, with warning

# S.O.D.A. to Alleviate Amygdala Hijacking


**S**top

**O**bserve a 10 second pause to breathe and think

**D**etach yourself to diminish the need to “be right”

**A**waken empathy and think from their perspective

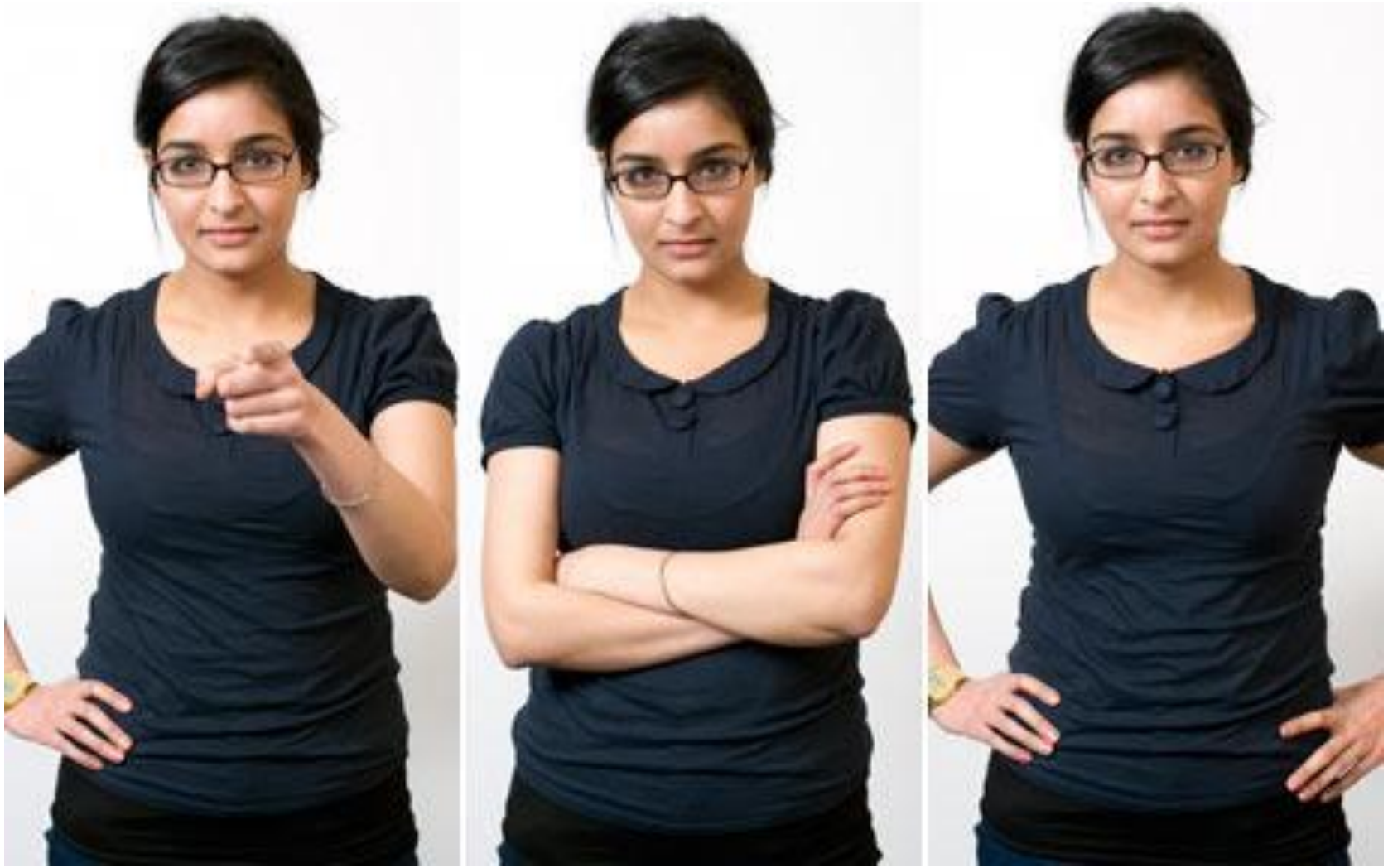
# Tone of Voice

## Compassion
Warm, friendly, inviting, open

## Authority
Firm, clear, strict, no-nonsense

## Engagement
Projected, varied, enthusiastic

# Body Language



# Body Language

# Word Choice

| | |
|---|---|
| “That’s wrong.” | “That’s not quite right.” |
| “Fix it.” | “See if you can do a little better.” |
| “Who’s not done yet?” | “Who’s still working?” |
| “It’s much better than it was.” | “You’re making great progress.” |
| “Raise your hand if you don’t get it.” | “Raise your hand if you’d like to hear that again.” |
| “Here’s a better way.” | “Here’s a different way.” |
| “What are you struggling with?” | “What can I help with?” |

# Packet Activity: Showing Empathy

Find a partner.

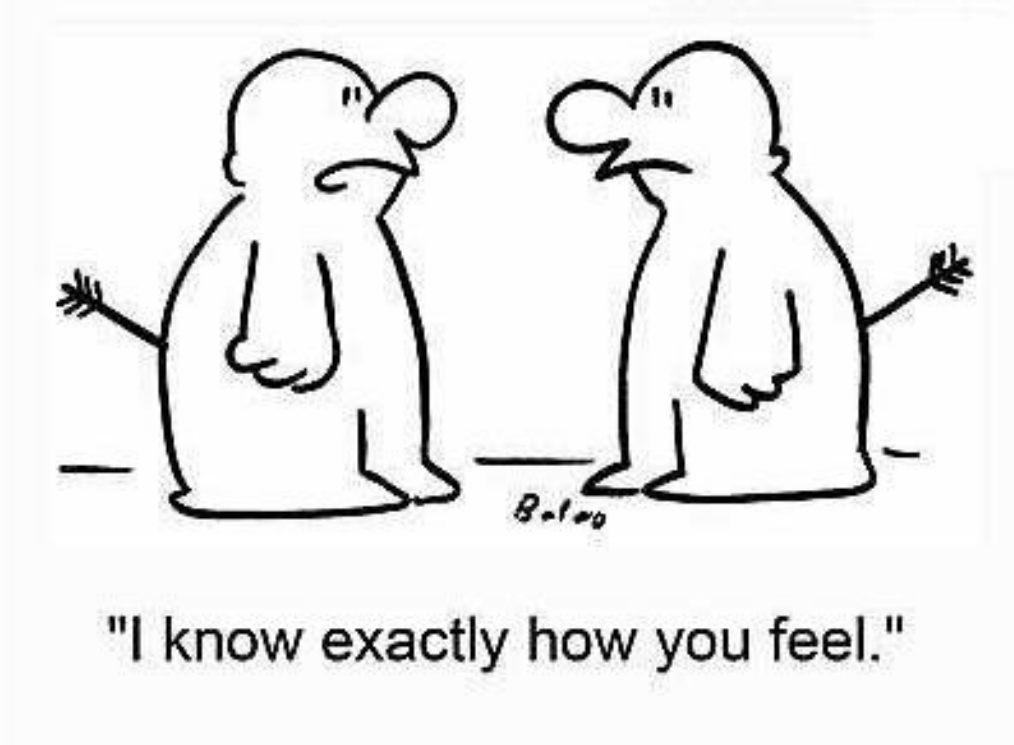
For each scenario, one partner will be a student; the other will be a teacher/TA.

Respond to the student with empathy.

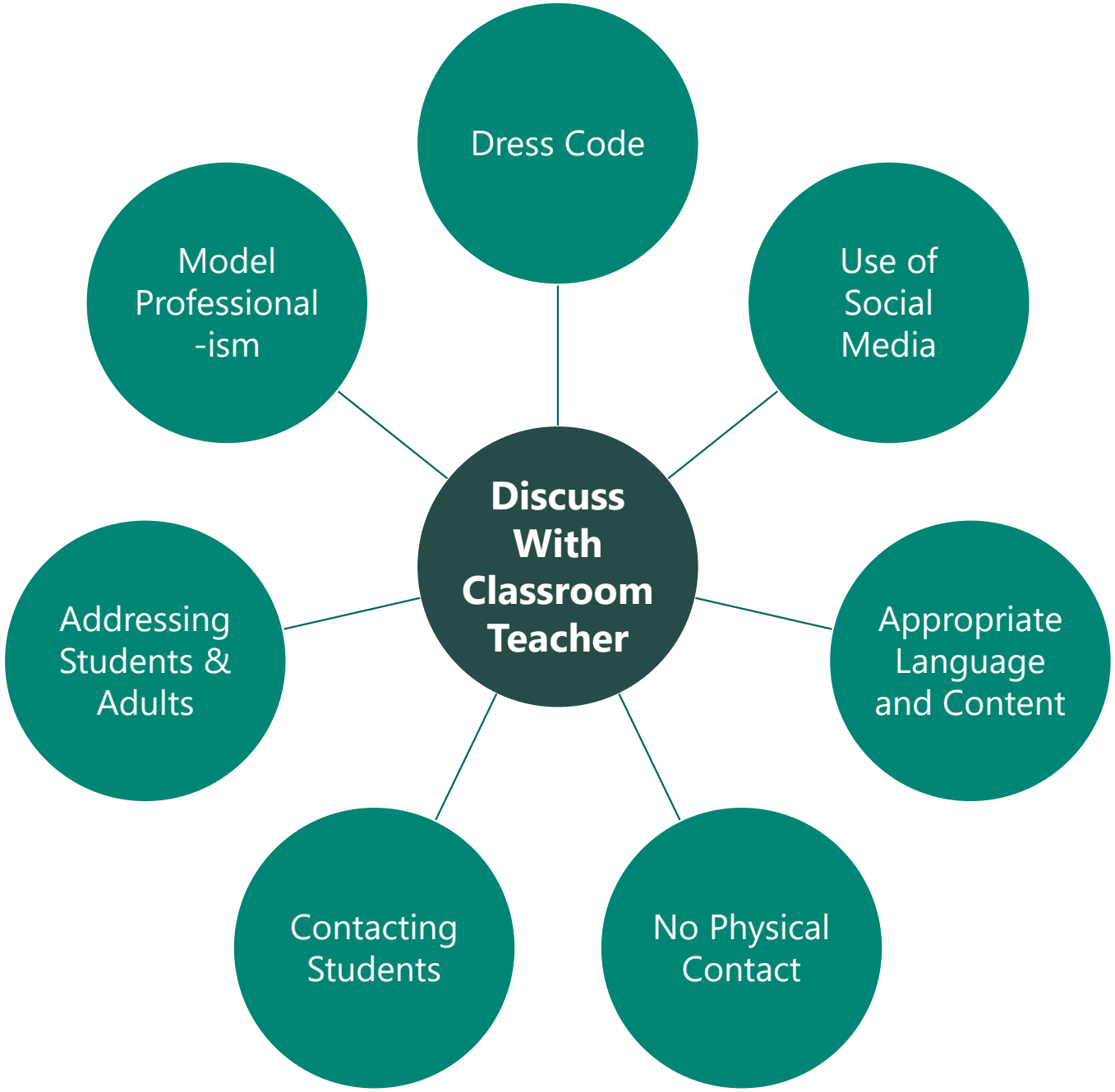
Think about your tone, body language, and word choice.

**You have 5 minutes.**

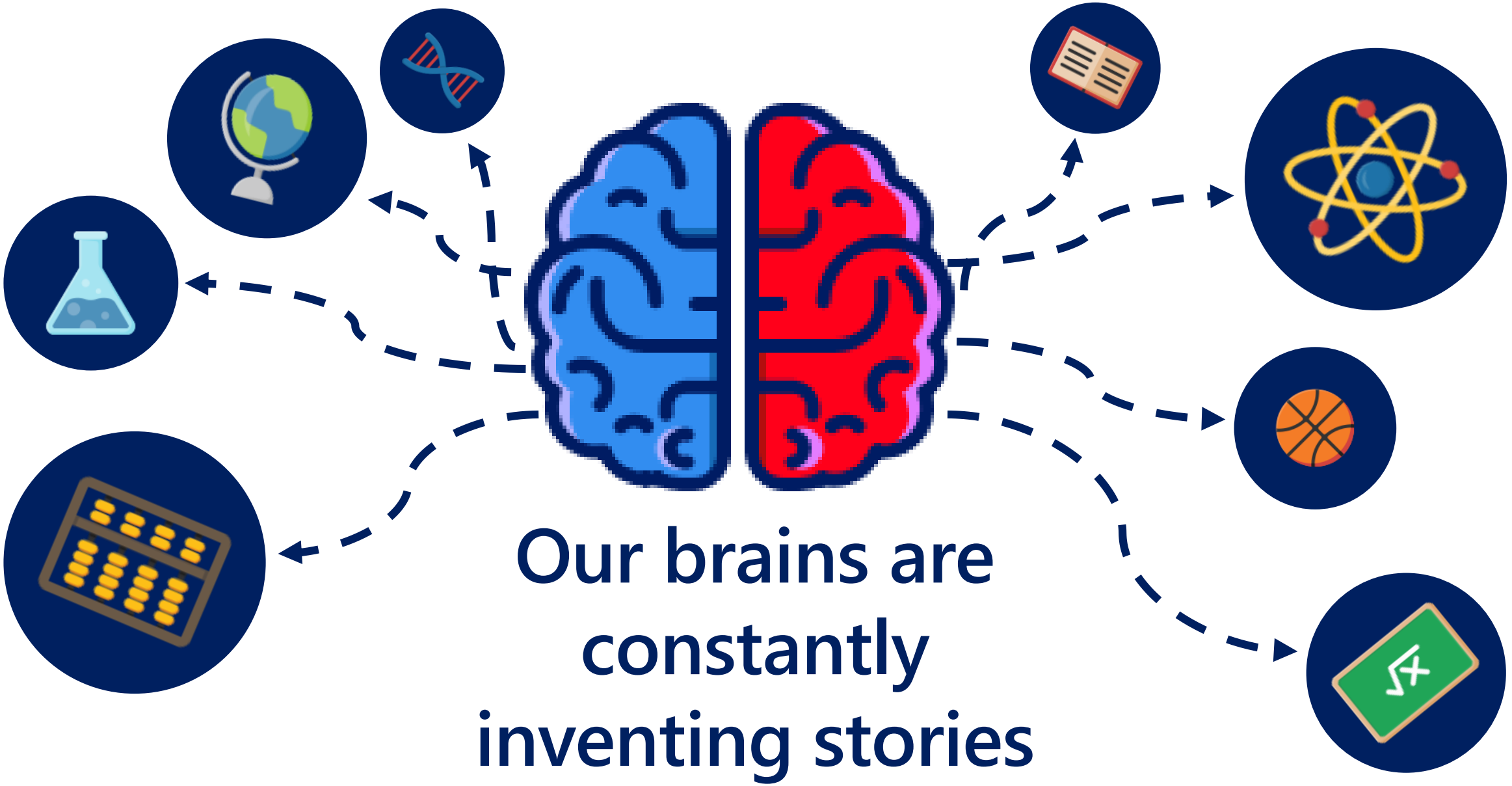
Activity Packet page 7



# School Norms

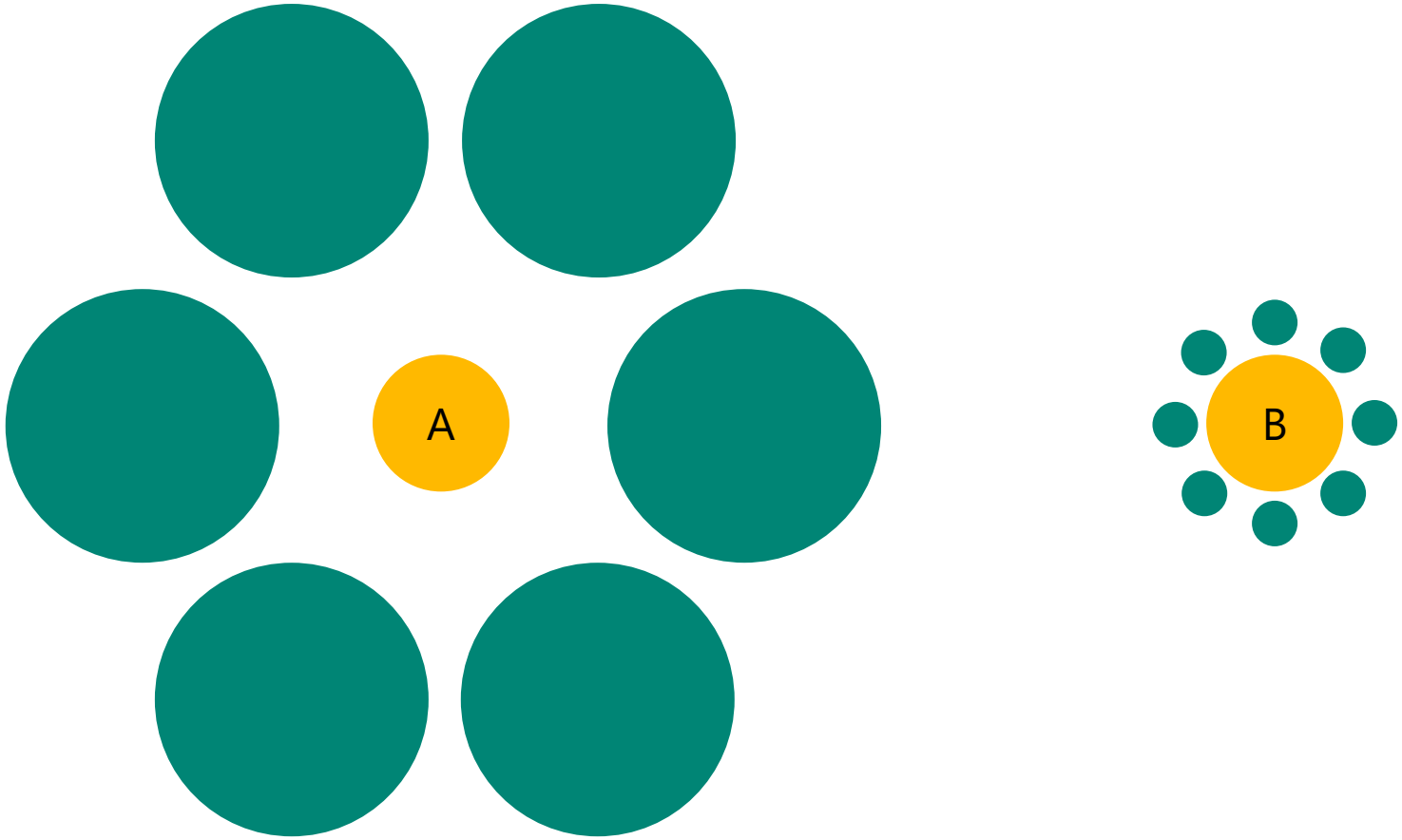



# Stereotype Threat and Implicit Bias



Our brains are constantly inventing stories

# Cognitive Biases



# What's in Your Classroom?

**How are the classrooms different?**

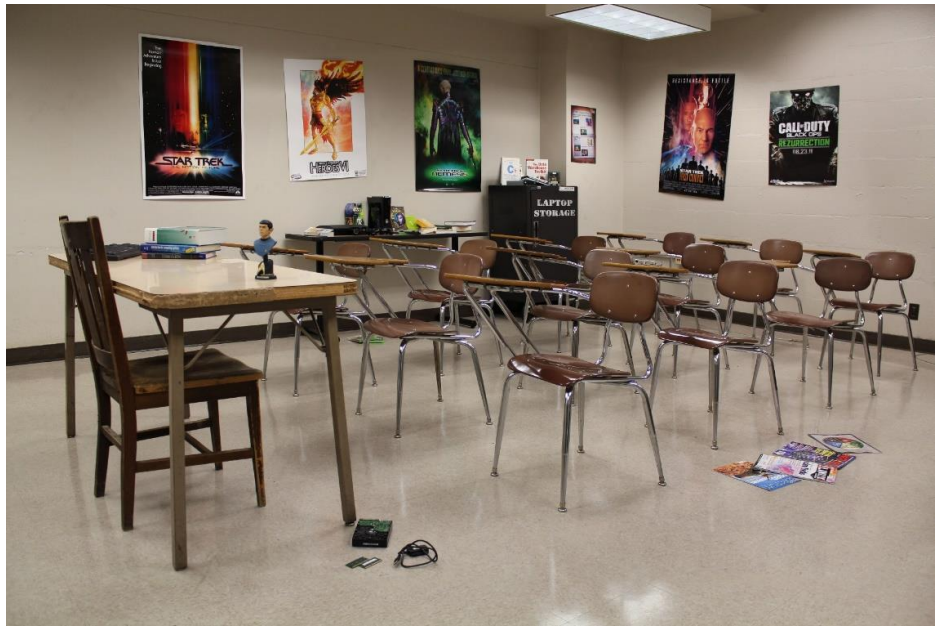
Are there particular cultures, attitudes, religions, genders implied in the wall covering?

How may those difference appeal to certain students?

How may those differences have the opposite effect?

**SPEND 3 MINUTES**

Activity Packet page 8-9


STAR TREK
THE MOTION PICTURE
HEROES VI
NEMESIS
RESISTANCE IS FUTILE
STAR TREK
FIRST CONTACT
LAPTOP
STORAGE


LAPTOP
STORAGE

# Images and Words Make a Difference.

Girls were almost three times more likely to say they would enroll in a computer science course if the classroom looked like the “non-stereotypical” one.

Women who read that computer scientists no longer fit these stereotypes were more interested in computer science than those who read that computer scientists fit the stereotypes

# Steps you can take

If you cannot redecorate the entire classroom

- One shelf with accomplishments, trophies
- Decorate one bulletin board

Resource for posters:
**https://www.ncwit.org/resources/type/posters**

Make examples and metaphors that are relevant to your students

# Stereotype Threat

*A situation in which people worry they will confirm stereotypes about their social group, sometimes leading to behavioral differences*

Before taking a math exam, students are told that the exam typically produces gender differences *("male students usually do better on this exam than female students")*

**Females students perform worse** than if they weren't primed, or if they are told there is no gender difference.

People can be "primed" for stereotype threat by images, words, attitudes of others

# Actions to Take in the Classroom

## ADDRESS THE "CONFIDENCE GAP"

Realize that **stereotype threat** may be at play when students downplay achievements.

Don't take statements of doubt in abilities at face value.

## ENSURE EQUAL OPPORTUNITY

Create a system to **call on all students equally**, for example, a deck of cards with names that can be selected at random.

## AVOID CREATING ISOLATION

When isolated, students from minority groups are often perceived as a proxy for the entire group they represent. Assign **at least 2 members of a minority** if possible.

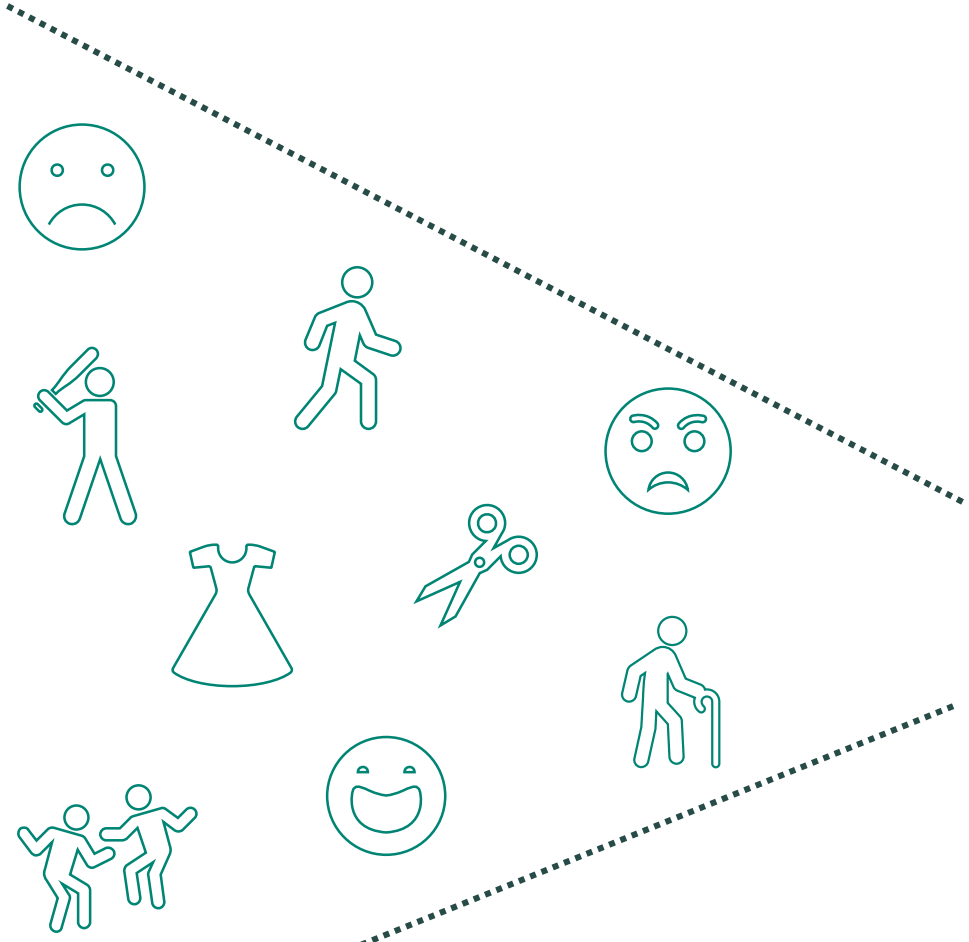
## MONITOR IMAGES, BE INCLUSIVE

Ensure that artwork, pictures, photographs convey **inclusive messages**.

Ensure assignments provide inclusive examples and problems.

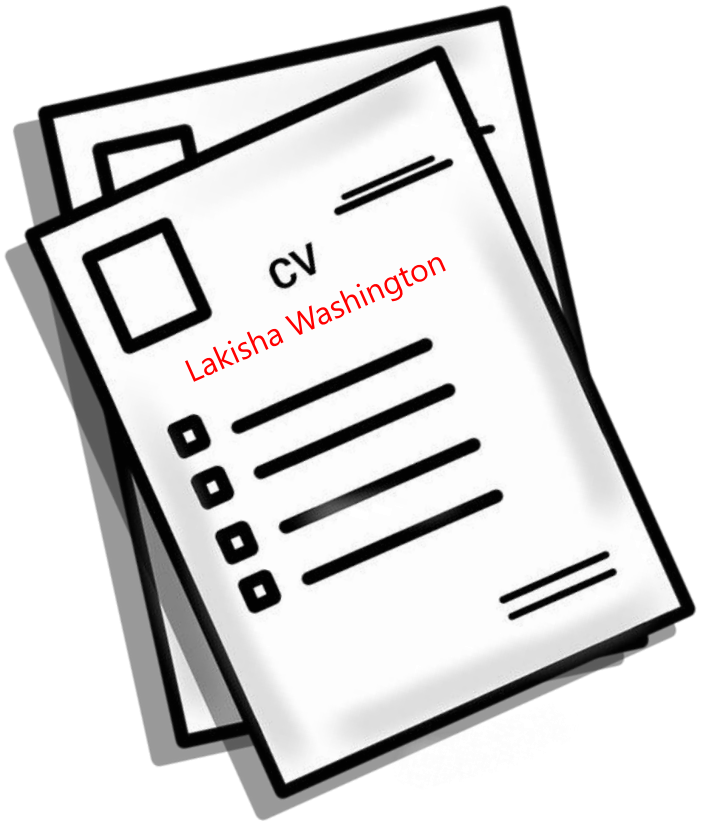
**Stereotype Threat**
How societal expectations affect our perceptions of ourselves

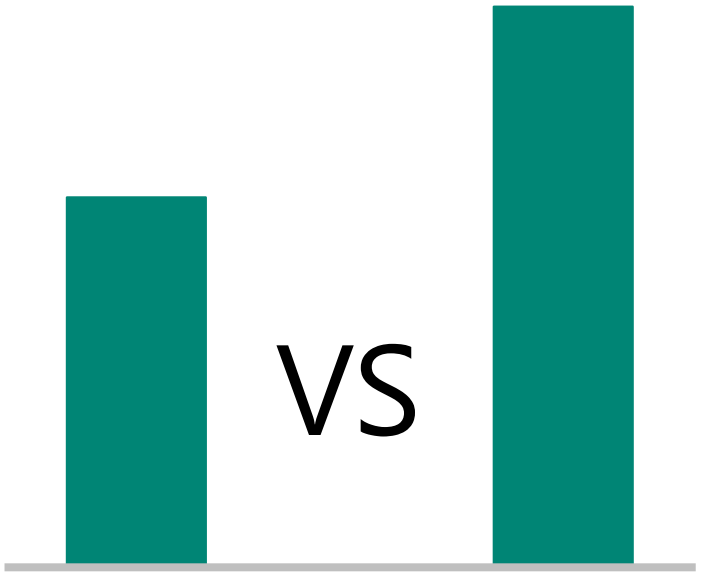
**Implicit Bias**
How society affects our perceptions of others

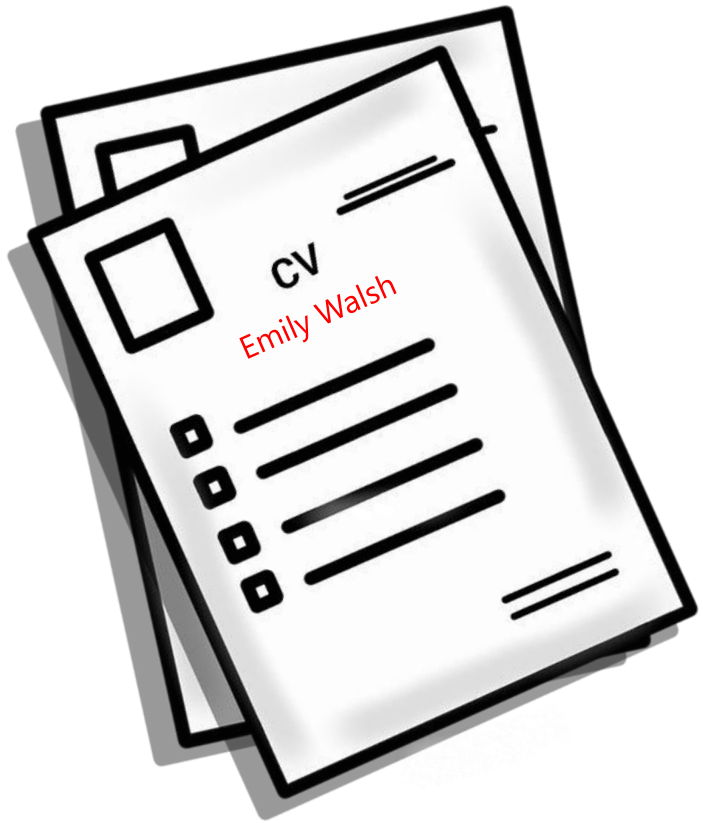



**Observations** + **Assumptions**

# Unconscious Bias in Hiring



# Implicit Bias

*attitudes or stereotypes that affect our understanding, actions, and decisions towards others in an unconscious manner*

Activated without an individual's awareness or intentional control

Includes both favorable and unfavorable assessments

Does not necessarily align with our declared beliefs

Usually favors our own groups

Malleable and pervasive

# Implicit Bias in the Classroom

A student asks for more time to complete an assignment. Do you grant the extension?

A student is surfing the internet during lab. Do you reprimand them?

You're visiting the cafeteria during lunch to recruit students for next year's CS class. Which students should you approach?

# Busting Bias: Recognize and Intercept

On the first day of class, a female student says she wants to become an engineer and your initial thought is that she won't be able to cut it.

**Recognize an underlying stereotype. Label it.**

**STEREOTYPE:**
*"Women aren't quantitative thinkers"*

**STEREOTYPE:**
*"Engineers work on computers all day and women need social interaction"*

# Busting Bias: Counter Stereotypes

**STEREOTYPE:**
*"Women aren't quantitative thinkers"*

**STEREOTYPE:**
*"Engineers work on computers all day and women need social interaction"*

## Challenge

Research doesn't support a gender difference for math performance after controlling for the number of math courses taken.

## Counter-generalization

"I know many successful female software engineers"

## Counter-example

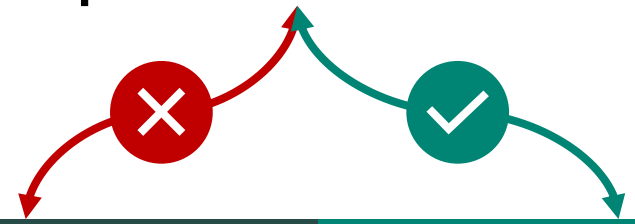
"Megan Smith, Lindsay Scott and Grace Hopper are/were great female programmers"

# Busting Bias: Individuate

## Learn about your students as individuals

- Learn their names.
- Discover their interests, ideas, customs, goals, and pet peeves.
- Use the Student Experiences Survey

## Seek situational rather than dispositional reasons



**Dispositional**

Behavior explained by internal characteristics of the individual: traits, abilities, or feelings

**Situational**

Behavior explained by a set of specific circumstances

# Dispositional vs Situational Attribution

Daniela is a well-mannered student who participates in class discussions, stays on task during lab, and turns in her assignments on time. **She got a failing grade on the first Unit Exam in your class.**

What dispositional reasons can you imagine for Daniela's failing grade?

What situational reasons can you imagine for Daniela's failing grade?

**Dispositional**

Behavior explained by internal characteristics of the individual: traits, abilities, or feelings

**Situational**

Behavior explained by a set of specific circumstances

# Group Activity: Dispositional vs Situational

Here are some possible explanations for Daniela's failing grade on the exam. Label each reason as situational or dispositional:

1. She hasn't been taught effective study skills for a course of this difficulty
2. She's not interested in computer science
3. She has an important audition coming up
4. She worked an extra shift at her job this week
5. The test was harder than she anticipated
6. She's not a quantitative thinker
7. She got in an argument with her best friend yesterday
8. She's not good at problem solving

**Dispositional**

Behavior explained by internal characteristics of the individual: traits, abilities, or feelings

**Situational**

Behavior explained by a set of specific circumstances

# Busting Bias: Empathize

**Seek opportunities for greater interaction with people different than you**

- Attend gatherings of minority-serving groups in your professional community
- Attend community events
- Seek out and invite diverse guests and speakers to your class

**Put yourself in their shoes. Imagine what it would be like to…**

- Have your abilities called into question
- Have assumptions made about your interests or intentions
- Be consistently pegged as a “troublemaker”
- Have an idea be discarded when you present it then applauded when someone else presents it later

# Activity: Reducing Implicit Bias

On a notecard, commit to one action you will do to reduce implicit bias

*Examples:*

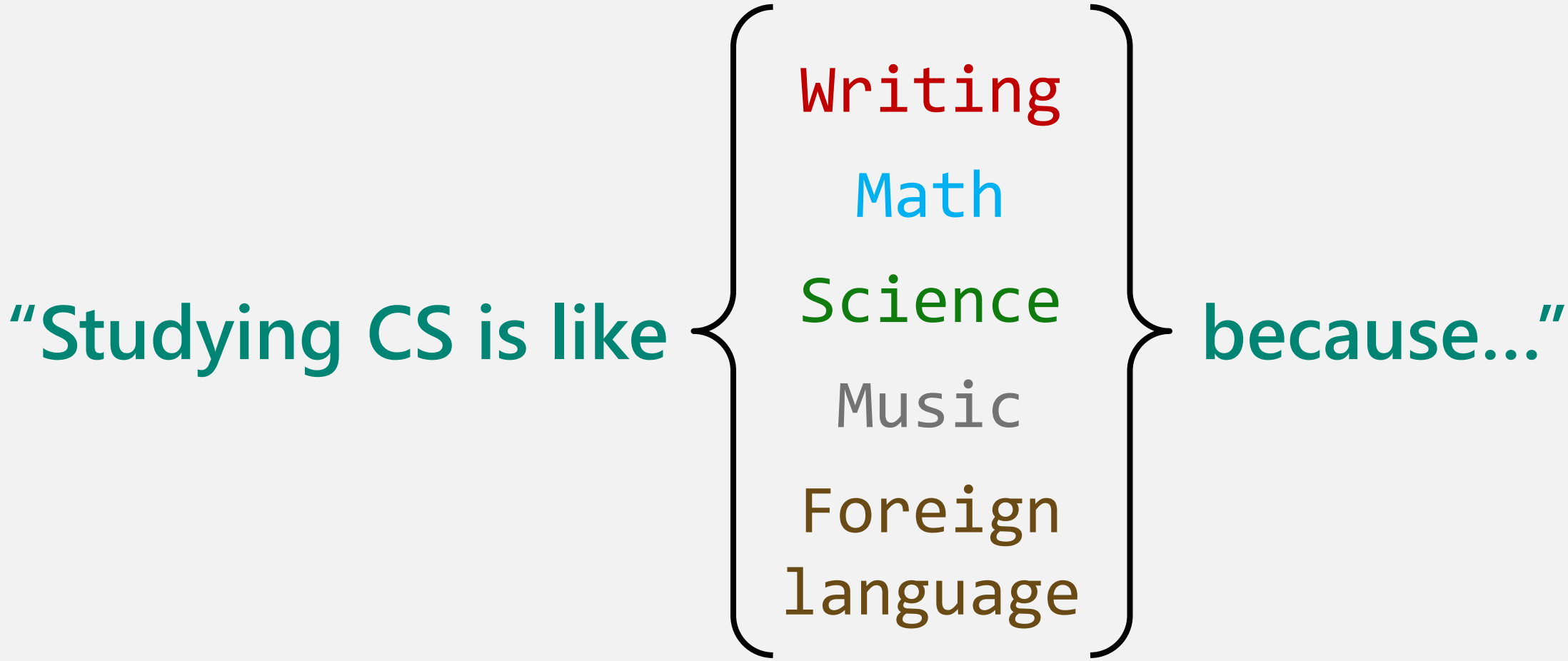
*I will get the class roster and learn the students names over the summer.*

*I will read a biography of Katherine Johnson.*

*I will attend the local Women in Tech meetup.*

Once finished, put your notecard in the "**Salad Bowl**"

# Dealing With Failure


"Studying CS is like
Writing
Math
Science
Music
Foreign language
because..."

# CS is Different

No single right answer

Rarely right the first time

Completely new concepts
(for most students)

***BUT***

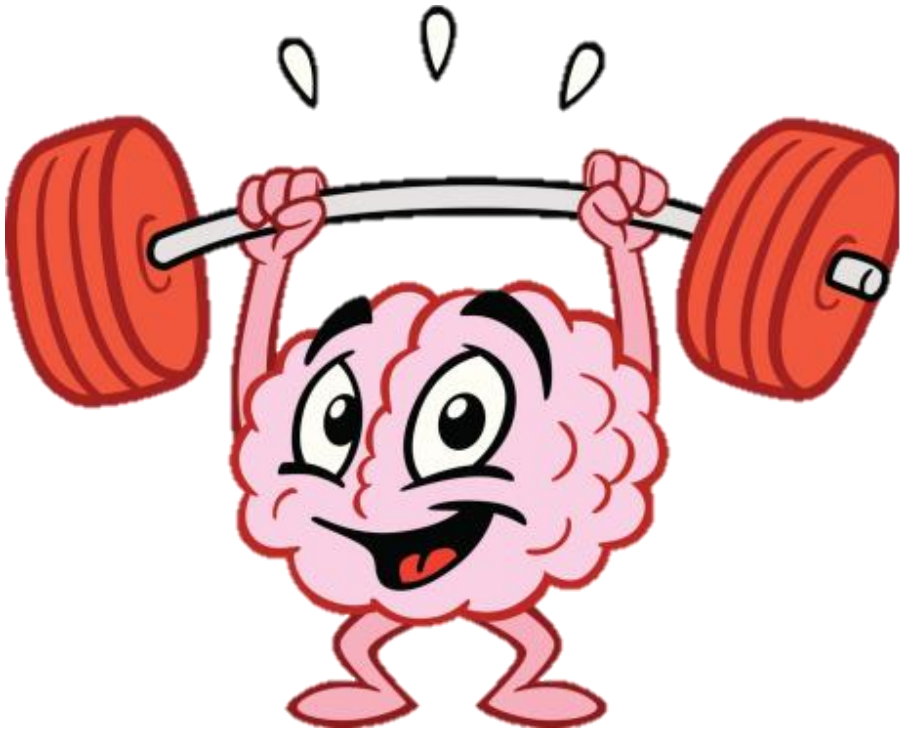
Not completely open-ended

Clear criteria for completeness

High expectations

According to Carol Dweck,
**Growth Mindset** is the belief that rather than being fixed or innate, **abilities can be acquired** through study and effort.


I'm a good student, I should be better at this
I'm bad at math; I'll be bad at this too
I don't even know where to start
What they're thinking
What they're doing
Frustration
Not seeking help
Cheating
Arguing over grades
Showing off
Shutdown
Not seeking help
Over-reliance on help
Paralysis
Not seeking help



*You'll get better at this if you keep working at it.*

I'm a good student, I should be better at this

I'm bad at math; I'll be bad at this too

I don't even know where to start

# Activity: Student Stories

1. Get into groups of 4; each group will be given a student persona.
2. Develop a short skit showing an interaction between your student persona and a volunteer or teacher.
3. Focus on:
   - How student is struggling with failure
   - How volunteer/teacher can help

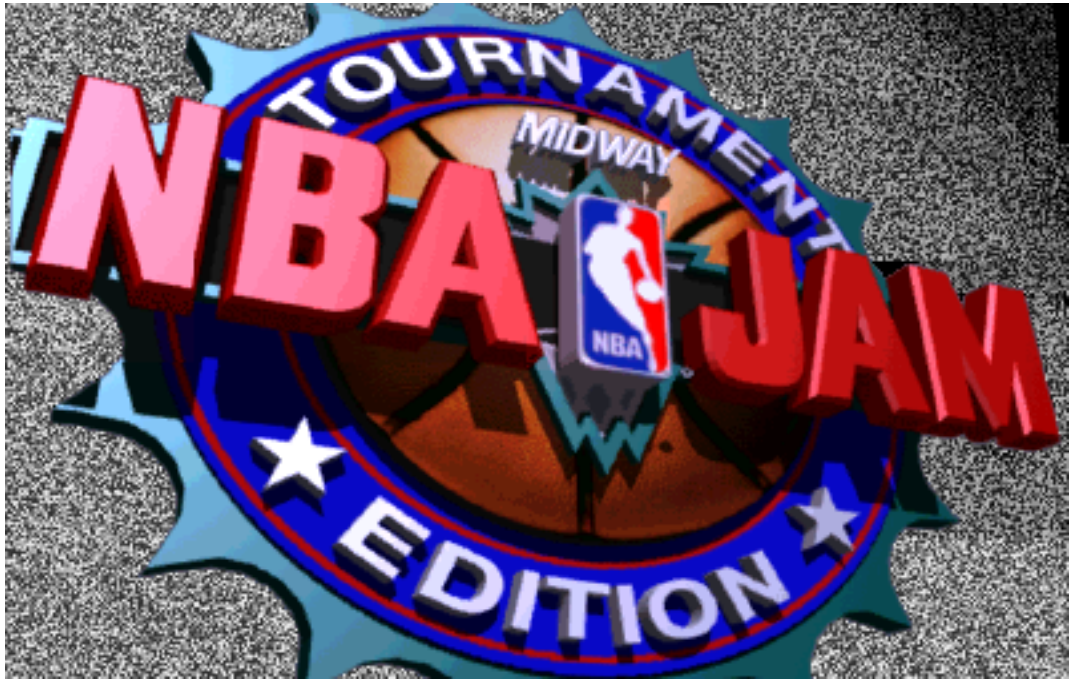
**You have 10 minutes.**

# Grading

# Let’s Play Basketball

# Objective Grading

1. How did the players' performances compare?
2. Who showed more improvement?
3. What are advantages and disadvantages to using purely objective grades (like basketball scores)?



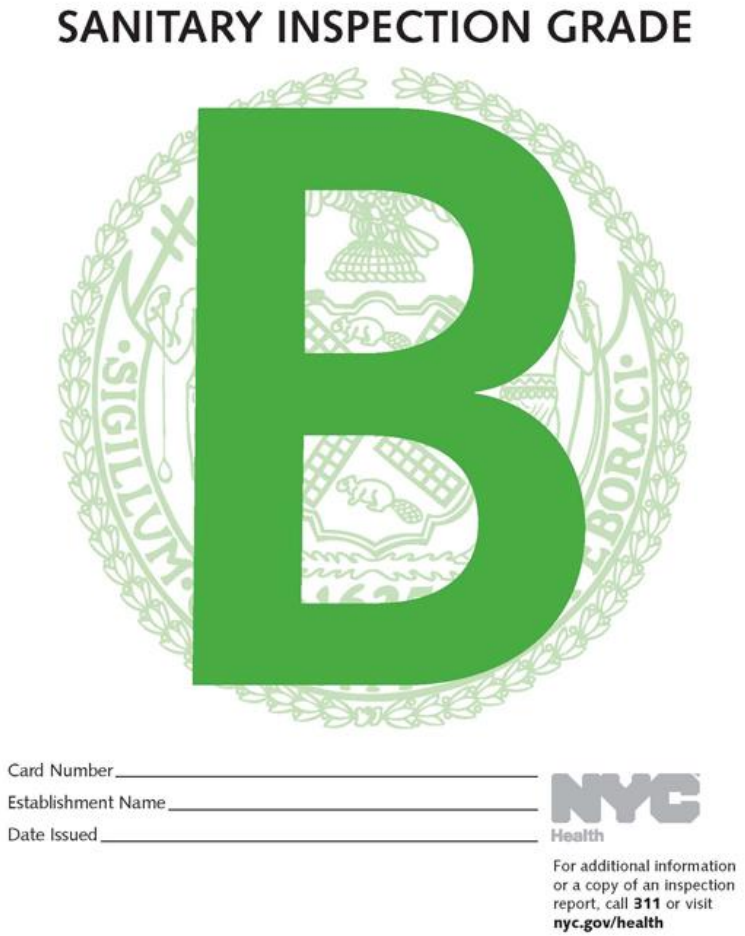
# Purpose of Grades

Think-pair-share:

Why do we give grades?

Who is/are the audience(s) for grades?

Do your answers to the above change depending on when or how the grades are given?



# Motivating Students with Grades

Provide mechanisms to improve or offset bad grades

- Test/quiz retakes
- Project improvements
- Makeup work

Require commitment from students

- If all homework complete, will drop lowest test
- If extra practice done, final exam can replace projects

Make individual deals as needed

Be aware of school/classroom teacher policies

# Grading Techniques

In the next **two minutes** write down (in your notebook) definitions of as many of these techniques as you are familiar with.

Corrections

Rubrics

Peer grading

Face-to-face grading

Skills Checklists

Correctness

Self grading

Written “Wise feedback”

Portfolio Assessment

Instructor Grading

Complete/Incomplete

# Activity: Grading Techniques

## For each of the following assignments, choose the best grading technique(s) from the list:

1. Unit test
2. Weekly quiz
3. Homework assignment
4. Lab work
5. Notebook
6. Project final submission
7. Project checkpoint

A. Rubric
B. Written Wise Feedback
C. Complete/Incomplete
D. Correct/Incorrect
E. Corrections
F. Peer Grading
G. Self Grading
H. Instructor Grading
I. Face-to-face Grading

# Grading Techniques

| Technique | Best for | Turnaround |
|---|---|---|
| **Rubrics w/ Comments** | Major projects, group assignments | 1 week |
| **Correctness** | Quizzes/Tests, small labs and homework assignments | 0-2 days |
| **Written Feedback** | Large homework assignments, project checkpoints | 2 days – 1 week |
| **Complete/ Incomplete** | Small labs and homework assignments | 0-2 days |
| **Student-Teacher Conference** | Major projects, project checkpoints | 1 week |

| Technique | Best for | Turnaround |
|---|---|---|
| **Instructor grading** | Tests/quizzes, major projects | 1 week |
| **Face-to-face grading** | Checkpoints, notebooks | 1 week |
| **Self grading** | Small labs, homework | Immediate + 1-2 days |
| **Peer grading** | Small labs, homework assignments, quizzes | Immediate + 1-2 days |
| **Corrections** | Quizzes/tests, projects | 2-4 days + 1-2 days |

# Peer Grading

## Student benefits

- Students see assignment three times (complete, grade, review)
- Hits multiple levels of Bloom's taxonomy (application v. analysis, synthesis v. judgement)

## Teacher benefits

- Evaluate two students' understanding on one assignment (submitter and grader)
- Save time

## **Don't** take peer grades on faith

- Students will miss things, not understand, and sometimes try to cheat

## **Do** spot-check peer grading results

- No need to review each question from each student in-depth

# Formats for Peer Feedback

### Helping Trios
Each student presents something they are working on and gets help from classmates.

### Chalk Talk
On the board or poster paper, students silently respond to an essential question related to a unit or lesson. Students build on ideas already written.

### World Café
Students rotate through tables discussing an essential question and recording parts of their conversation.

# Corrections

- Provide students opportunity to correct and learn from mistakes including with peers
  - Helping Trios
- Make instructor and peer feedback more actionable
- Reduce pressure to demonstrate mastery on first attempt

Commonly used for tests

- E.g. test graded, but answers not discussed
  - students can resubmit test and earn back 75% of points for fixed mistakes

Can also be used on projects, HW, etc.

# Packet Activities: Grading Practice

- Lab Grading Activity
- Project Grading Activity
- Written Project Feedback Worksheet

**You have 20 minutes (total)**

*Activity Packet*

- *APCSA: page 11-12*
- *AP CSP: page 13-15*
- *Intro CS: page 16-17*
- *Everyone: page 18*

# The Bigger Picture

## Calibration

Lots of grading, but lots of you!

**Best bet (especially for HW): Take turns**

- Drastically reduces calibration issues
- Easier to work around volunteer schedules

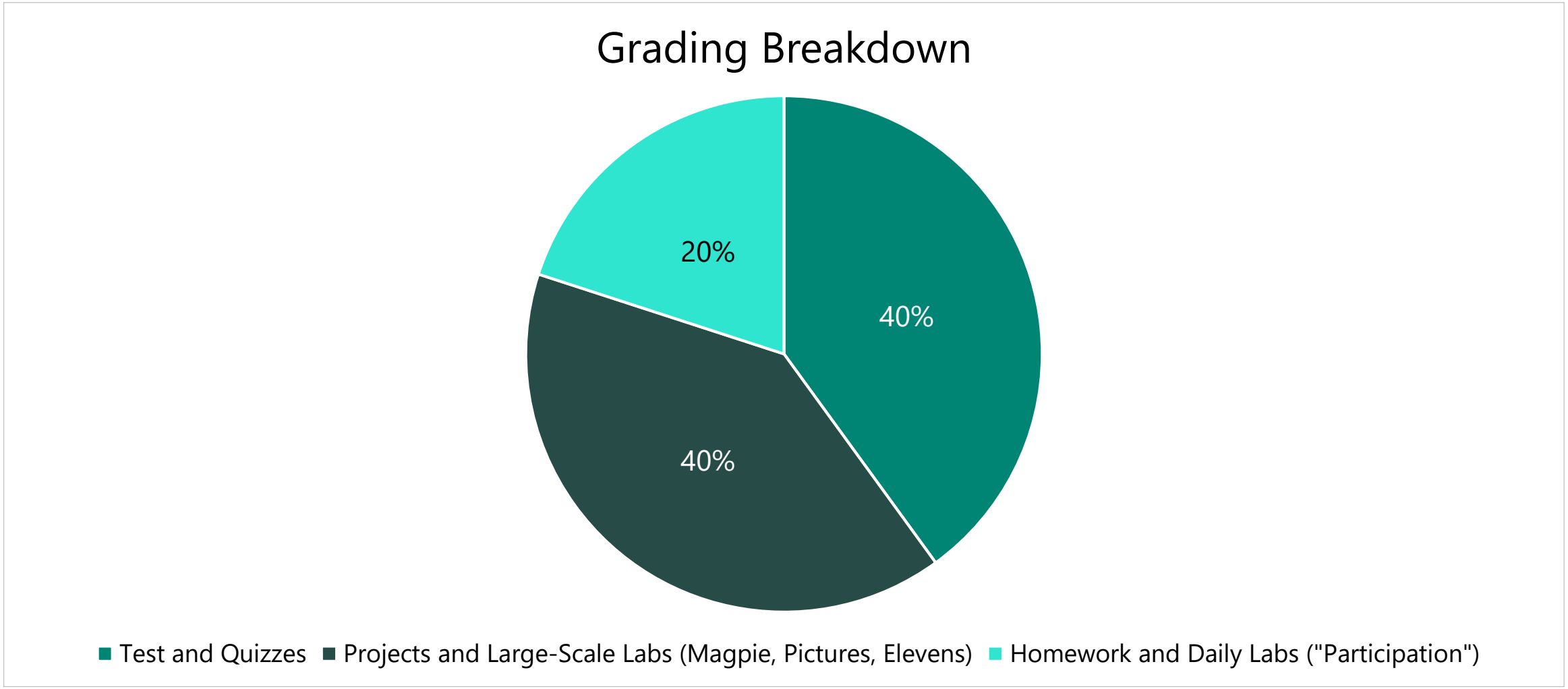
If necessary, for projects split submissions

- Avoid this when you can; can create difficulties

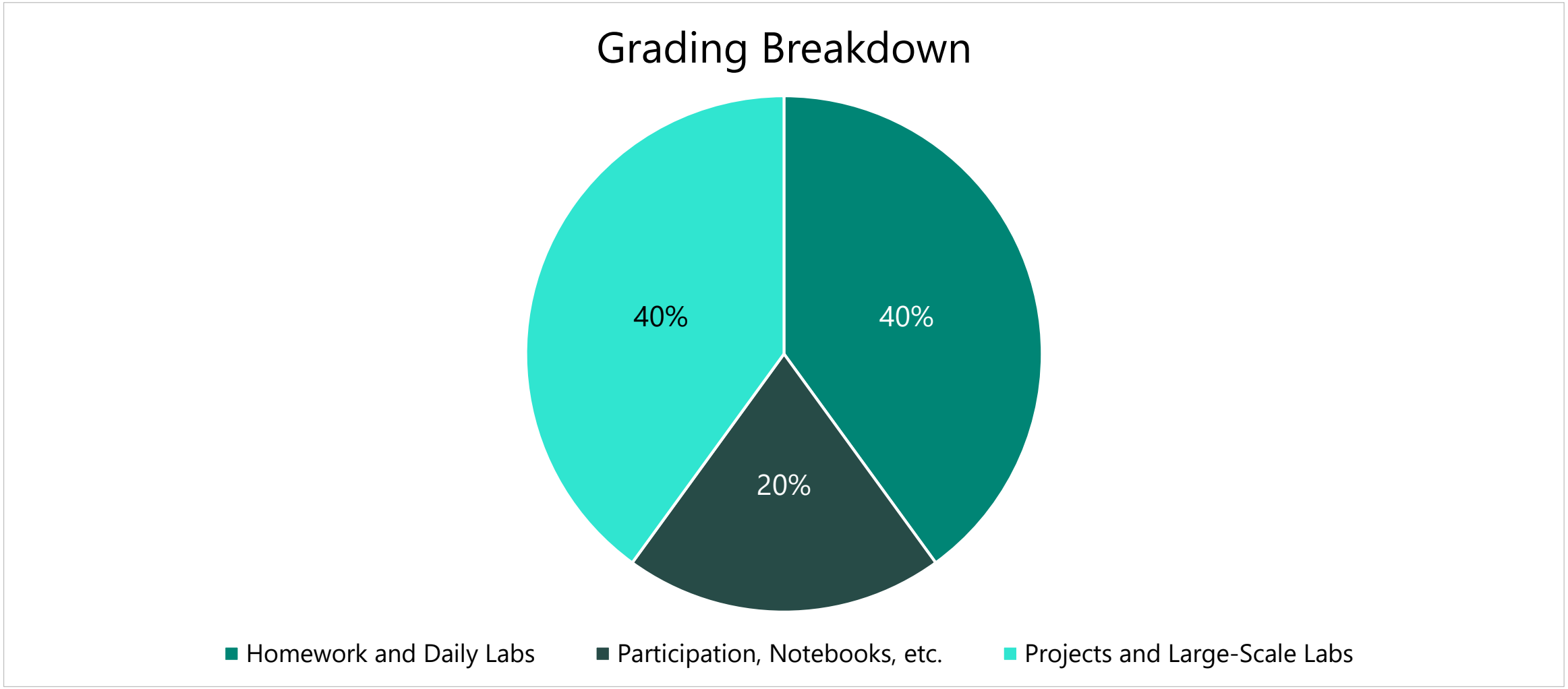
**Remember to calibrate**

- Ensure students aren't advantaged/disadvantaged by who grades their assignment
- Grade a few as a team to shake out uncertainties
- Necessary both within and across assignments

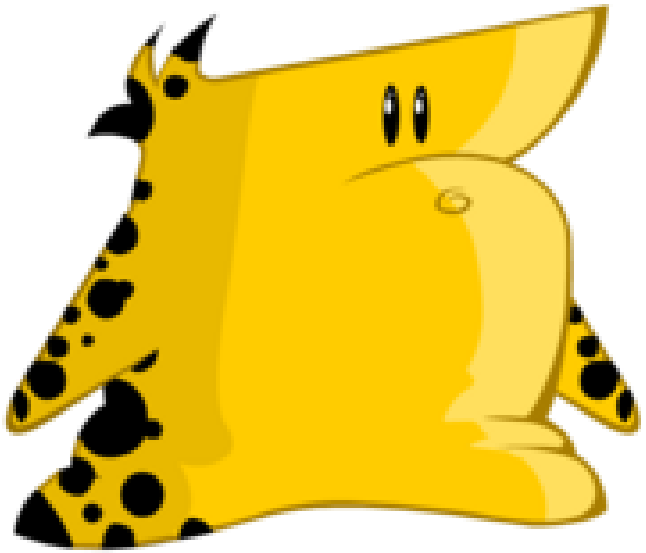
# AP CS A – 40/40/20



# Intro CS – 40/40/20



# Academic Honesty in CS



# The Principle of Academic Honesty

# Cheat or No Cheat

## Cheating – “Bring down the hammer”

## Not Cheating – “High five; all good”

# Cheat or No Cheat

Simon doesn't understand how to animate a sprite walking. He asks Karema
for help.

Karema sits down in Simon's chair and starts to explain how to change the sprite's costume and x position in a loop, building the loop on Simon's computer
as she talks.

After Karema gets up, Simon thanks her and then changes some of the loop values.

**CHEAT OR NO CHEAT?**

*(fist for cheating, palm for not cheating)*

# Cheat or No Cheat

Maya is stumped on how to read-in each fraction separately in her FracCalc() program. She is staring at her code trying to think of something to try.

Antuan sees her difficulties and says, “Use a Scanner!”

Maya asks, “What’s that?”

Antuan guides Maya to the class website and the slides that explain how Scanner works.

**CHEAT OR NO CHEAT?**

*(fist for cheating, palm for not cheating)*

# Cheat or No Cheat

The sprite in Stephen's platform game isn't falling correctly after it jumps. He asks Nora for help. Nora opens up a previously-submitted lab assignment that involved combining conditionals and loops and reminds Stephen how it worked in that assignment.

Stephen opens up his version of that old assignment and copies some blocks into his platform game.

**CHEAT OR NO CHEAT?**

*(fist for cheating, palm for not cheating)*

# Cheat or No Cheat

Sara and Christine both have Pong working, but the gameplay is boring because the ball bounces in very predictable ways. They sit together at one workstation and experiment with different algorithms for making the movement more interesting. They come up with a really neat way to vary things.

Both students use this algorithm in their submission.

**CHEAT OR NO CHEAT?**

*(fist for cheating, palm for not cheating)*

# Cheat or No Cheat

Evangeline was out sick when the class covered some tips for how to store fractions in FracCalc(). Out of the corner of her eye, she sees Bryan starting to write his program, so she turns her head to watch his screen and see which variables he's creating.

**CHEAT OR NO CHEAT?**

*(fist for cheating, palm for not cheating)*

# Best Practices – Cheating

Create a clear policy (based on school requirements)
Review policy during first few days of school and before the first major project
Post it with the syllabus on LMS or class website

Use face-to-face grading of projects
Have students answer reflection questions on lab submissions
Investigate unexpected differences

Follow through on policy
Involve parents and admins as necessary

# Mock Lab

# Review: The Way of the Meerkat

~30 sec – 1 minute in each interaction

Triage, hint, actionable feedback, move on.
- Do not get monopolized.

See every student in 1 period *even if they don't ask for help*

Collect formative assessment data
- By the end of class, your team should know each student's progress on the lab

# Review: Socratic Questioning

## 1. Diagnose Misunderstanding

- How are you doing?
- What is this supposed to do?
- How does it work?

## 2. Ask Leading Questions

- Where in your code do you calculate the sum?
- How many times will this loop execute?
- Will the loop continue when n is 10?

## 3. Actionable Next Step

Question or a statement:

- "Do you know what your next step is?"
- "Look at last week's lab on loops and see if you can find something similar that will help you."

Use "Wise Feedback"

- High expectations
- Personal assurance
- Actionable next step

# Review: “Wise Feedback”

## High Standards

- Affirm holding high standards
- Mistakes are a sign of the high demands of the task/class, not of (perceived) low capability

## Personal Assurance

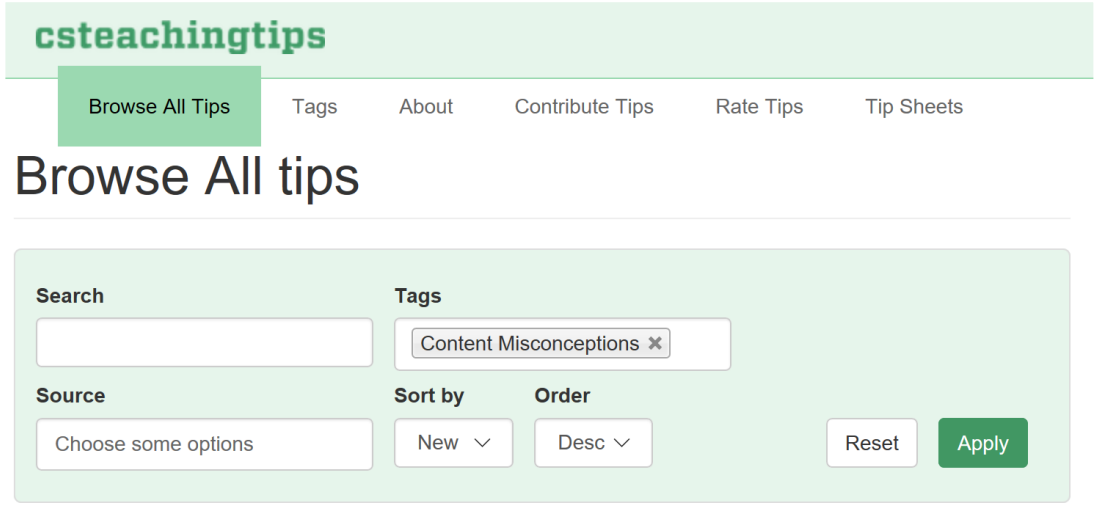
- Assure the student that he or she is capable and can improve with effort
- Reference past successes or progress

## Actionable Steps

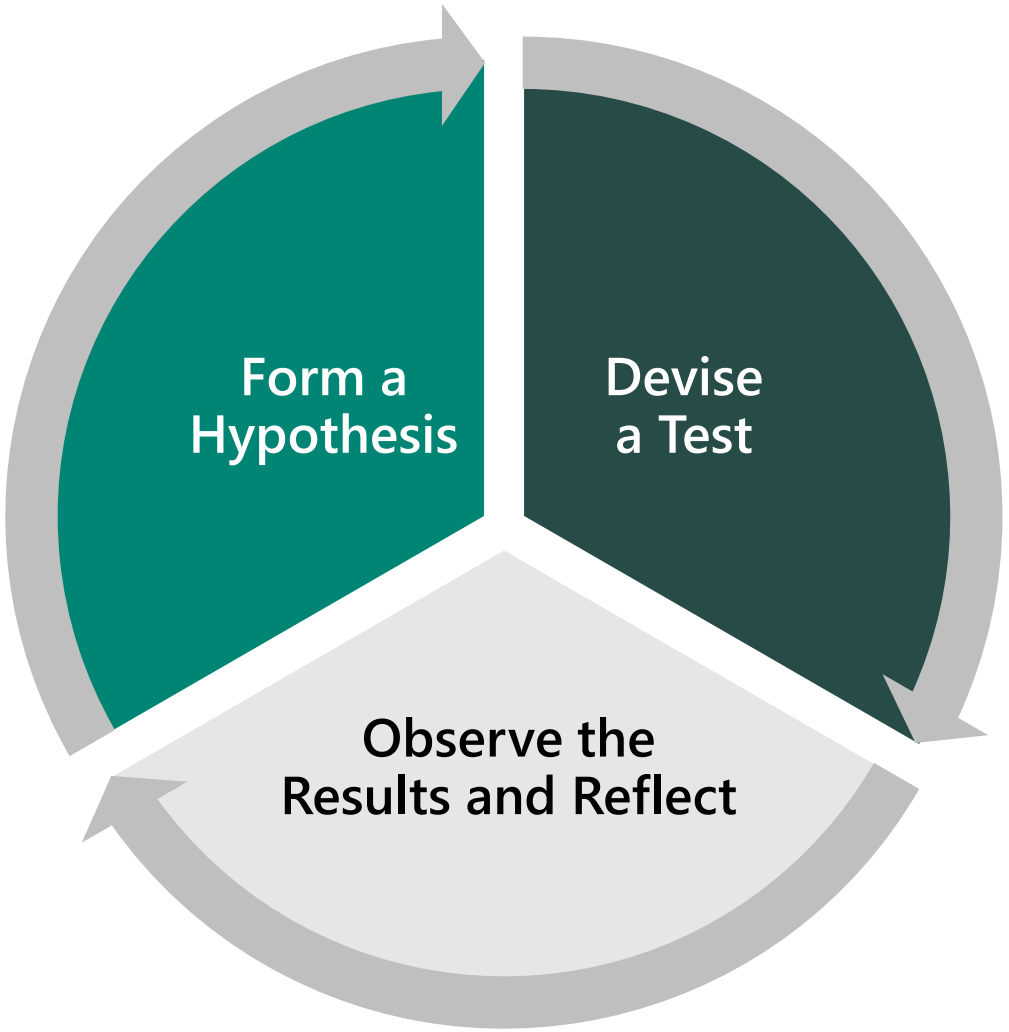
- Give specific, actionable steps to work on
- Instructive rather than evaluative
- Corrective rather than vague

# CS PCK: Common Misconceptions

1. Pick a number n, between 2 and 7
2. Navigate to http://csteachingtips.org/
3. Click on "Browse All Tips"
4. Type “Content Misconceptions” in **tags** box at top and select Apply
5. Jump to page *n* of the search results
6. Read about a misconception that interests you



# Debugging without Debuggers




**For novices, debugging tools might…**

- Add complexity
- Take a lot of time to learn
- Distract from building their **notional machine**

# Debugging By Output

## BEFORE

```
def total(int[] arr):
    sum = 0
    for (i = 0; i < arr.length; i++):
        sum += i
    return sum
```

## AFTER

```
def total(int[] arr):
    sum = 0
    for (i = 0; i < arr.length; i++)
        sum += i
        print("sum:" + sum) # debug
    return sum
```

# Debugging By Output

```
def total(arr):
    sum = 0
    for (i = 0; i < arr.length; i++)
        sum += i
        print("sum:" + sum) # debug
    return sum
```

```
>>> total([6,3,2,5])
sum:0
sum:1
sum:3
sum:6
6
```

| | |
|---|---|
| **Problem** | The sum is wrong |
| **Hypothesis** | **Either** there is a problem with the number of times I'm looping, **or** with the operand I'm adding |
| **Test Plan** | I'll print out the sum for each iteration of the loop and call the function with a short list |
| **Observation** | We looped 4 times. The sum increased by 0, then 1, then 2, then 3. |
| **Reflection** | The number of times we're looping is correct, but we're adding the wrong thing. |

# Debugging by Simplification

```
n = 1
sum = 0
x = readInt()
while (x > 0):
    sum += n
    x = readInt()
avg = sum/n
print(avg)
```

```
n = 1
sum = 0
x = readInt()
# while (x > 0):
    # sum += n
    # x = readInt()
# avg = sum/n
# print(avg)
print (x)
```

```
n = 1
sum = 0
x = readInt()
while (x > 0):
    # sum += n
    x = readInt()
    print (x)
# avg = sum/n
# print(avg)
```

```
n = 1
sum = 0
x = readInt()
while (x > 0):
    sum += n
    x = readInt()
    print (sum)
# avg = sum/n
# print(avg)
```

Hypothesis:
Maybe I'm not using readInt() right.

Hypothesis:
Maybe the problem is in exiting the loop

Hypothesis:
Maybe the problem is in calculating the partial sum

# Packet Activity: The Misconception Game

1. Diagnose the problem and unblock the student by *asking questions and reading the code*
2. Spend 2 minutes reading your "student" code and the error "Play dumb" with your TA until they help you find the error
3. The TA doesn't need the student to see the solution, just the next step (marketing/triage)

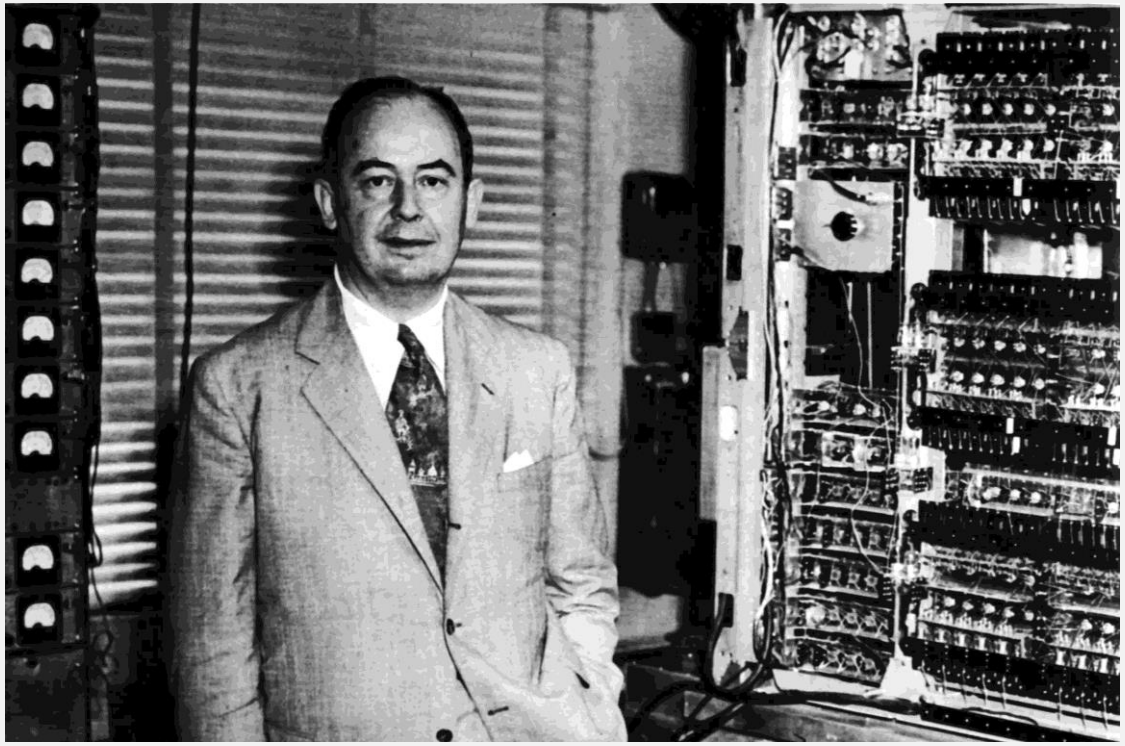
***What mental notes are you making about the student's progress/understanding (formative assessment!)?***

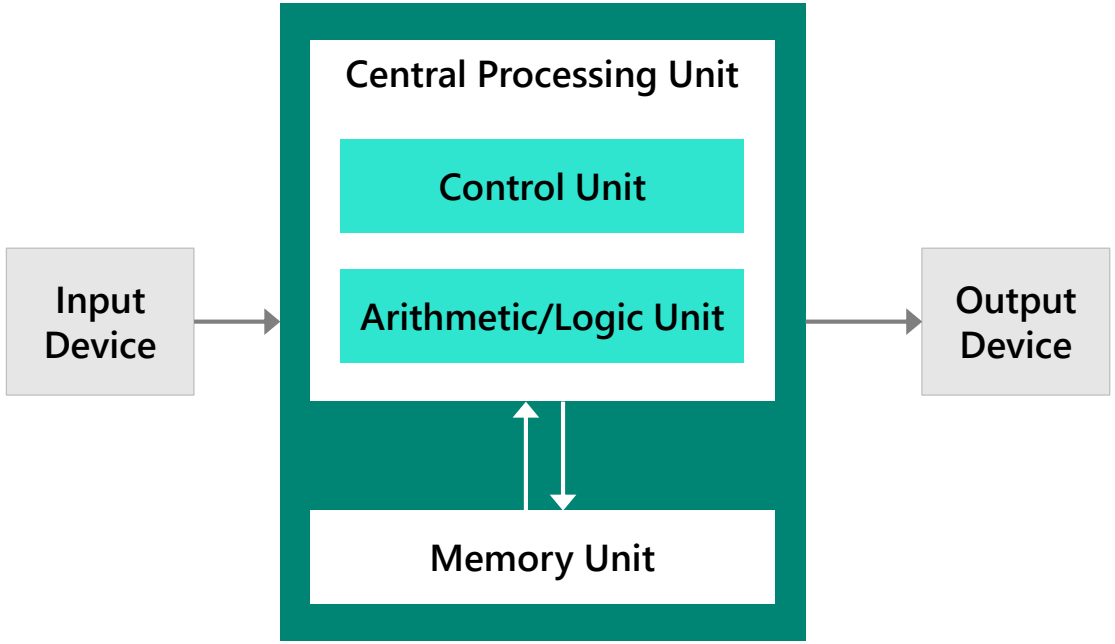
Activity Packet page 18-21

# Classroom Procedures

# The Line Up

# Students follow Von Neumann Architecture!





# Why It Matters

| How you planned it | |
|---|---|
| 8:10 | Greet students at door |
| 8:15 | Do Now |
| 8:20 | Review Do Now |
| 8:25 | Introduce Lab |
| 8:35 | Start the lab |
| 9:00 | Exit Ticket |

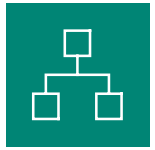
| How it actually happens | |
|---|---|
| 8:10 | Greet students at door |
| 8:15 | Half the class hasn’t arrived |
| 8:20 | Students don’t realize they are supposed to do the Do Now |
| 8:25 | Extra time to do the Do Now since they didn’t work on it before |
| 8:27 | Needed more time than expected to go over the Do Now |
| 8:32 | Handing out today’s lab assignment |
| 8:37 | Rush through lab instructions |
| 8:47 | Move to lab |
| 8:50 | Students watching YouTube or waiting for their computer to boot |
| 8:55 | Students finally working on lab |
| 9:01 | Students realize class is almost over, start packing up |
| 9:05 | Bell rings, half of the students forget to save their work |

# The Line Up

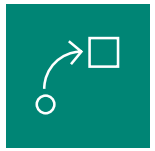
## Procedures should be:

- Efficient
- Consistent
- Rehearsed

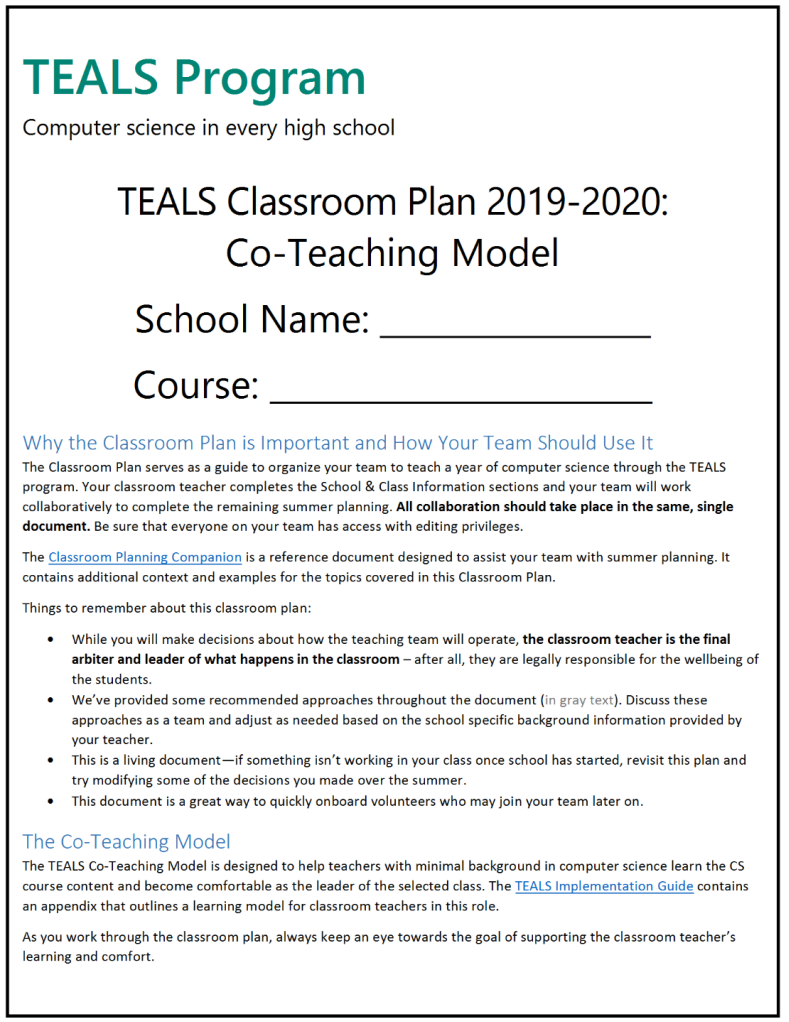
# Open Your Classroom Plan!



Open your team's classroom plan to the "**Classroom Procedures**" section.



Need a new one?
https://www.tealsk12.org/ClassroomPlan



## TEALS Program

Computer science in every high school

### TEALS Classroom Plan 2019-2020: Co-Teaching Model

School Name: _____

Course: _____

#### Why the Classroom Plan is Important and How Your Team Should Use It

The Classroom Plan serves as a guide to organize your team to teach a year of computer science through the TEALS program. Your classroom teacher completes the School & Class Information sections and your team will work collaboratively to complete the remaining summer planning. **All collaboration should take place in the same, single document.** Be sure that everyone on your team has access with editing privileges.

The Classroom Planning Companion is a reference document designed to assist your team with summer planning. It contains additional context and examples for the topics covered in this Classroom Plan.

Things to remember about this classroom plan:

- While you will make decisions about how the teaching team will operate, **the classroom teacher is the final arbiter and leader of what happens in the classroom** – after all, they are legally responsible for the wellbeing of the students.
- We've provided some recommended approaches throughout the document (in gray text). Discuss these approaches as a team and adjust as needed based on the school specific background information provided by your teacher.
- This is a living document—if something isn't working in your class once school has started, revisit this plan and try modifying some of the decisions you made over the summer.
- This document is a great way to quickly onboard volunteers who may join your team later on.

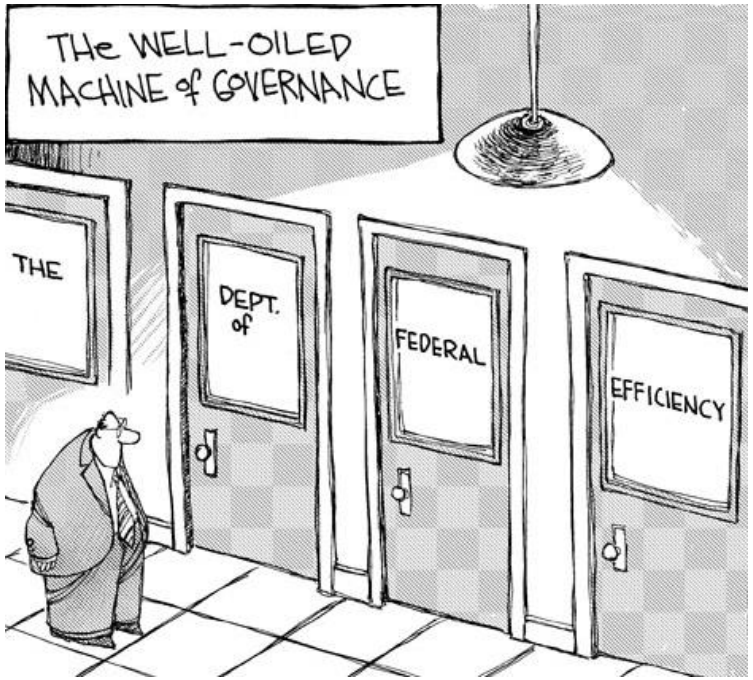
#### The Co-Teaching Model

The TEALS Co-Teaching Model is designed to help teachers with minimal background in computer science learn the CS course content and become comfortable as the leader of the selected class. The TEALS Implementation Guide contains an appendix that outlines a learning model for classroom teachers in this role.

As you work through the classroom plan, always keep an eye towards the goal of supporting the classroom teacher's learning and comfort.

# Activity: Classroom Troubleshooting

In each of the following scenarios, something has gone wrong in the classroom!




1. Identify the issue
2. Determine which type of classroom procedure from the Classroom Plan could help prevent the issue
3. Propose a rehearsed classroom procedure that could help solve the problem

# Scenario #1: The Go-Getter

*Each day's lesson and lab are posted on the course website the night before class. Jacob is a very enthusiastic student who typically looks at the website as soon as he arrives in class and starts working on the lab, ignoring the instructors during the lesson.*

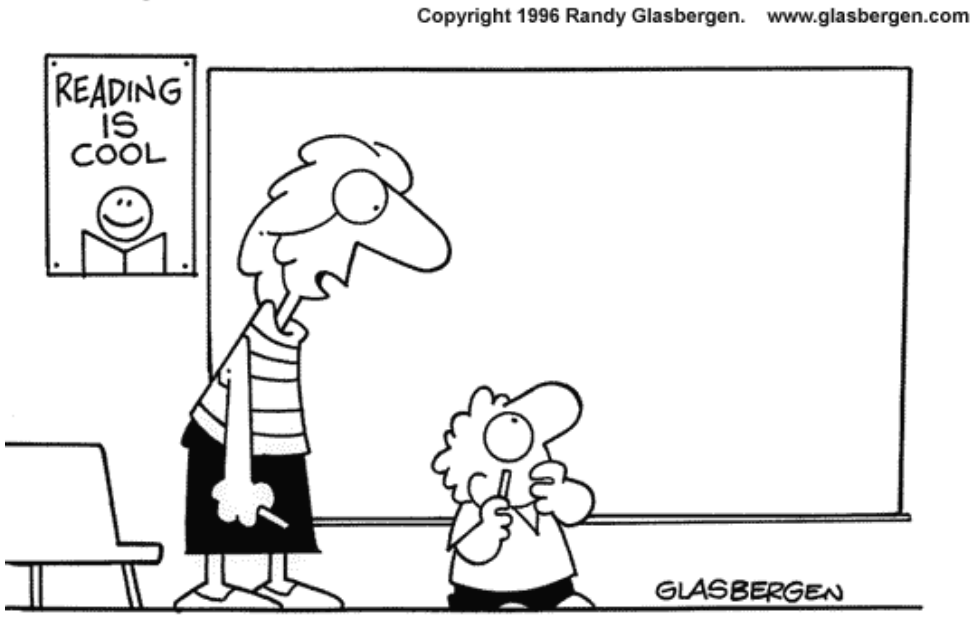
*The volunteers have begun to notice that Jacob asks a lot of questions during lab that were covered during the lesson. He also often "forgets" to follow instructions that were given verbally that are different than the written directions.*

# Scenario #2: Click Here!

*Anjuli has just finished grading the first major project for her class. The next day, Xavier angrily asks Anjuli why he got no credit for the project. Anjuli checks her notes and tells Xavier that he never submitted the project.*

*Xavier responds, "I definitely did! I e-mailed it to the address you gave us the night it was due! I used the subject 'Click on this awesome program.'" Anjuli later finds an e-mail with that subject in her spam folder, but can't tell who it is from.*

# Coming Up




"There aren't any icons to click. It's a chalk board."

# Mock Lesson

**Who**

New teaching teams in Co-Teach or Lab Support Model

**What**

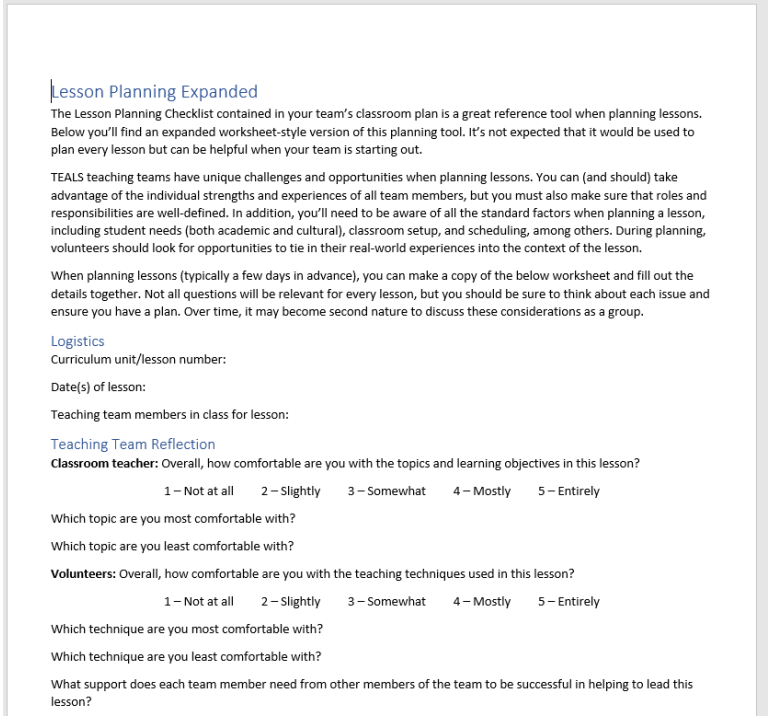
Your team will prepare and present a lesson from the curriculum

**When**

During School-Year Kickoff (“Training #3”)

**How to Prepare**

- See the module in canvas for lesson selection
- Use the Classroom Plan “Lesson Planning” checklist.
  - https://aka.ms/TEALSlessonplanner
  - Assign roles for the lesson
  - Adapt examples/assignments for student-relevancy



Lesson Planning Expanded

The Lesson Planning Checklist contained in your team’s classroom plan is a great reference tool when planning lessons. Below you’ll find an expanded worksheet-style version of this planning tool. It’s not expected that it would be used to plan every lesson but can be helpful when your team is starting out.

TEALS teaching teams have unique challenges and opportunities when planning lessons. You can (and should) take advantage of the individual strengths and experiences of all team members, but you must also make sure that roles and responsibilities are well-defined. In addition, you’ll need to be aware of all the standard factors when planning a lesson, including student needs (both academic and cultural), classroom setup, and scheduling, among others. During planning, volunteers should look for opportunities to tie in their real-world experiences into the context of the lesson.

When planning lessons (typically a few days in advance), you can make a copy of the below worksheet and fill out the details together. Not all questions will be relevant for every lesson, but you should be sure to think about each issue and ensure you have a plan. Over time, it may become second nature to discuss these considerations as a group.

Logistics

Curriculum unit/lesson number:

Date(s) of lesson:

Teaching team members in class for lesson:

Teaching Team Reflection

**Classroom teacher:** Overall, how comfortable are you with the topics and learning objectives in this lesson?

1 – Not at all 2 – Slightly 3 – Somewhat 4 – Mostly 5 – Entirely

Which topic are you most comfortable with?

Which topic are you least comfortable with?

**Volunteers:** Overall, how comfortable are you with the teaching techniques used in this lesson?

1 – Not at all 2 – Slightly 3 – Somewhat 4 – Mostly 5 – Entirely

Which technique are you most comfortable with?

Which technique are you least comfortable with?

What support does each team member need from other members of the team to be successful in helping to lead this lesson?

# Homework

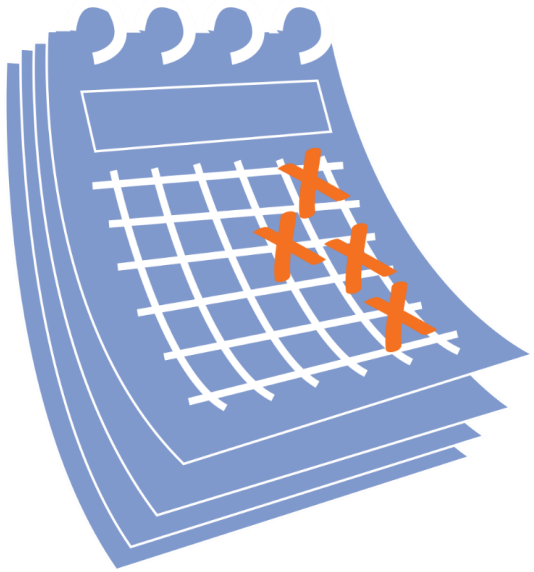
## Will be posted on Canvas

- Implement remaining major projects from your curriculum
- Training modules

## Participate in Forums!

## Another team meeting and RM check-in

# Important Dates



**Round 2 Check-ins**

*Week of <Date>*

**Training Session #3/School Year Kickoff**

*<Date/Time>*

*<Location>*

**First TEALS Monthly Meetup**

*<Date/Time>*

*<Location>*

# Exit Ticket!

https://aka.ms/TEALS2019Summer2