{STEM}

Teacher Leadership
Program at Georgia Tech®

sponsored by **Honeywell**

Student STEM Challenge Mentoring Handbook

2019 - 2020

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Program Overview

The STEM Teacher Leadership Program (STLP)

Sponsored by Honeywell Hometown Solutions and facilitated by the Center for Education Integrating Science, Mathematics and Computing (CEISMC) at Georgia Tech, the STEM Teacher Leadership Program at Georgia Tech aims to create a professional network of teachers to serve as instructional leaders in computer science as well as to strengthen the computational aspects of the science, technology, engineering and math (STEM) curricula to enhance students' STEM learning experience.

STLP participating school districts include Atlanta Public Schools and Clayton, Cobb, DeKalb, Fulton, and Gwinnett County Schools. Teachers selected for the program (middle and high school) have strong recommendations from their education leaders, a demonstrated ability to implement innovative instructional practices, and possess the skills and willingness to serve as STEM ambassadors. These teachers participate in the program through four major components:

- A STLP summer training program
- Participation in the Honeywell Student STEM Challenge
- Partnership with a Honeywell mentor
- Participation in the STLP Teacher Leadership Symposium

In your role as a Honeywell STLP mentor, you will serve as a mentor and role model to teachers in the program as they implement what they have learned in the summer training program into their classrooms and as they begin to engage their students in the Honeywell Student STEM Challenge. This will include activities such as being available for conversation by phone or email as well as an in-person classroom visits.

The team at CEISMC has prepared this mentor handbook to provide some assistance as you continue in your role as a Honeywell mentor. We hope you enjoy the experience, and please do not hesitate to reach out to us using the Contacts page in this handbook if you have any questions.

Thank you *for your contribution to our schools, our students and STEM education in our communities!*

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Program Overview (cont.)

This page provides further background into the non-mentoring components of the program. You may wish to review this page to gain better context of the teachers' experiences.

The STLP Summer Training Program

As part of STLP, all teachers were required to attend a paid, 4-week summer training on computer science related concepts and pedagogy. Topics include a variety of programming topics (senors, inputs/outputs, robotics, smarthomes, and more) but generally focuses on the Micro:bit platform as a vehicle for learning . At the end of the training, teachers were required to create an action plan and amended classroom syllabi for implementing what they learned into their classrooms.

The Honeywell Student STEM Challenge

The Honeywell Student STEM Challenge is a software engineering competition exclusively open to the students of teachers who participated in STLP. Students will work in teams to solve real-world challenges using software coding and computation techniques. Each teacher will work with their assigned mentor to assist students in executing the challenge. There will be two pools of winners from the STEM Challenge—an initial pool of "finalists" who are invited to a winners showcase at GA Tech for another round of judging, and the final overall winners determined at the showcase. See this link for the overall STEM Challenge rules and framework.

The STLP Teacher Leadership Symposium

STLP for each teacher cohort culminates in a teacher leadership symposium – a one day leadership and professional development event hosted at Georgia Tech. At this symposium, STLP teachers will present to their fellow cohort members the strategies and tools which they have found most useful throughout the program that have been implemented in their classroom. This event is tentatively scheduled for spring 2020, though more details will be provided as the program advances.

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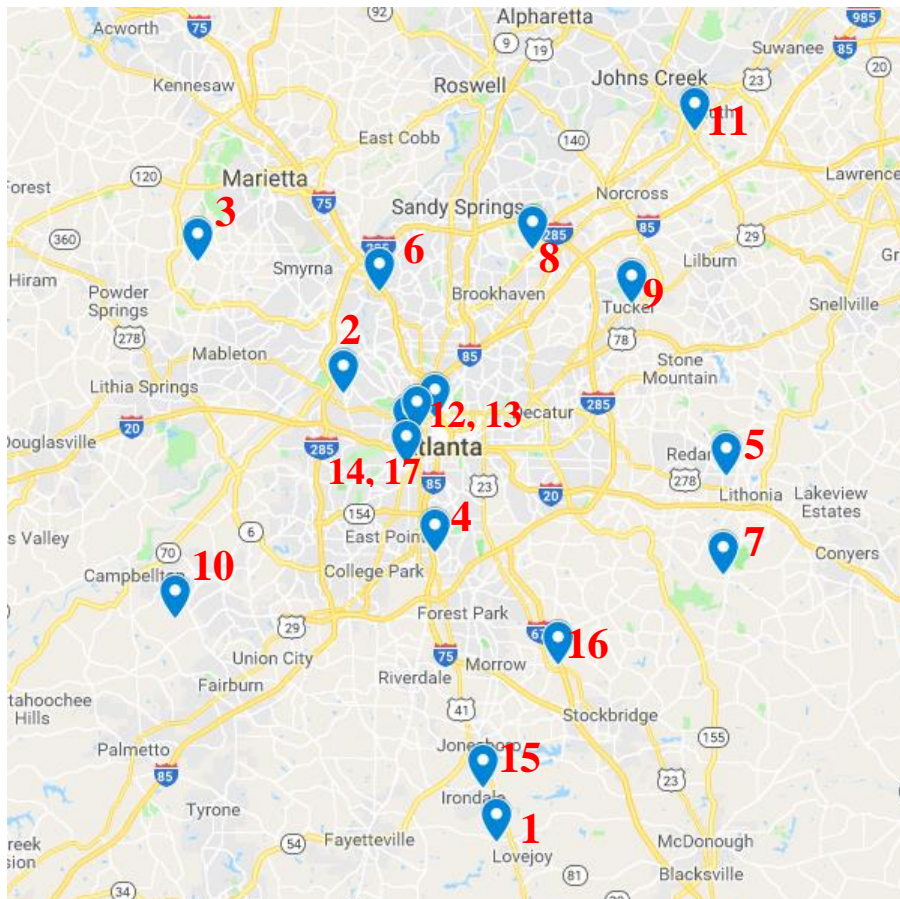
STLP Program Timeline

As individual deadlines within the program are subject to change, only the broad monthly timeframe is presented here. Specific deadlines for the program will be presented in a separate document.

June 2019   Teachers attend the 4-week summer STLP training. Mentors visit.

Aug. 2019   Teachers begin implementing STLP in their classrooms. STEM Challenge officially begins.

Sept. 2019   Schools submit estimate number of competing projects to CEISMC.

Nov. 2019   Students finish up STEM Challenge projects. Teachers submit final STEM Challenge projects to CEISMC by Thanksgiving break. Judging of STEM Challenge projects begins.

Dec. 2019   STEM Challenge judging concludes and initial pool of finalists are announced.

Jan. 2020   Student finalists compete at the winners showcase at GA Tech and the overall winners of the STEM Challenge are determined.

Spring 2020   Teachers continue to implement computer science in their classrooms and further develop their computer science instruction with the support of CEISMC. Teachers participate in the spring STLP Symposium where their knowledge and lessons learned with other members of the cohort.

Participating Schools

1. Lovejoy High School
2. BEST Academy
3. Smitha Middle School
4. Crawford W. Long Middle School
5. Lithonia High
6. North Atlanta High
7. Arabia Mountain High School of Engineering and Energy
8. Chamblee Carter High School
9. Tucker High School
10. Langston Hughes High School
11. Duluth Middle School
12. Booker T. Washington High School
13. Centennial Academy Charter
14. Michael R. Hollis Innovation Academy
15. Mundy's Mill Middle
16. Rex Mill Middle School
17. Joseph Emerson Brown Middle School

Participating Teachers

Naseera Chong naseera.chong@clayton.k12.ga.us **Phone:** 4047355606 **School:** Lovejoy High School **District:** Clayton County	**Marlon Alfaro** mech.alfaro@gmail.com **Phone:** 4049094735 **School:** BEST Academy **District:** Atlanta Public Schools
Alissa Walens alissa.walens@cobbk12.org **Phone:** 404-798-5622 **School:** Smitha Middle School **District:** Cobb County	**Devon Southlea** devon.southlea@apsk12.org **Phone:** 2406447224 **School:** Crawford W. Long Middle School **District:** Atlanta Public Schools
Timothy Gant tgant71@gmail.com **Phone:** 6786424037 **School:** Lithonia High **District:** DeKalb County	**Derryll Johnson** djjohnson@apsk12.org **Phone:** 9014884806 **School:** North Atlanta High **District:** Atlanta Public Schools
Shenica Bridges-Mathieu Shenica_Bridges_Mathieu@dekalbschoolsga.org **Phone:** 4046558283 **School:** Arabia Mountain High School of Engineering and Energy **District:** DeKalb County	**Lucretia Gant** tlgant@aol.com **Phone:** 770-861-7409 **School:** Chamblee Charter High School **District:** DeKalb County

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Participating Teachers (cont.)

Stacey Williams slwilliteach@gmail.com **Phone:** 678-232-2247 **School:** Tucker High School **District:** DeKalb County	**Mariama Boone** mariamaboone@gmail.com **Phone:** 4047132724 **School:** Langston Hughes High School **District:** Fulton County
Deepa Pendalwar Deepa_Pendalwar@gwinnett.k12.ga.us **Phone:** 7708450076 **School:** Duluth Middle school **District:** Gwinnett County	**Tiffany Edmond** tiffanyedmond2@gmail.com **Phone:** 770-843-6501 **School:** Booker T. Washington High School **District:** Atlanta Public Schools
Lajuana Blackshear lajuanab40@gmail.com **Phone:** 404-820-0953 **School:** Centennial Academy Charter **District:** Atlanta Public Schools	**Charmaine Smith** petrice98@gmail.com **Phone:** 773-619-3775 **School:** Michael R. Hollis Innovation Academy **District:** Atlanta Public Schools
Ereka Nails erekanails@gmail.com **Phone:** 404-834-7541 **School:** Booker T. Washington High School **District:** Atlanta Public Schools	**Karen Artis** artisk23@gmail.com **Phone:** 4044412978 **School:** Mundy's Mill Middle **District:** Clayton County

Participating Teachers (cont.)

Victor Martinez

victor.martinezvargas@clayton.k12.ga.us

Phone: 4042072221

School: Rex Mill Middle School

District: Clayton County

Keith Broughton

kbroughton@apsk12.org

Phone: 404-219-4280

School: Joseph Emerson Brown Middle School

District: Atlanta Public Schools

For a closer and more detailed profile of each of the teachers, visit the following link:

http://bit.ly/2KsSs8w

Program Contact List

You will receive the contact information for your mentee teacher(s) in a separate document. Below represents the contact information for members of the STLP team at Honeywell and CEISMC that you might interact with.

Educational Outreach Coordinator - CEISMC
Joshua King
joshua.king@ceismc.gatech.edu

Program Director - CEISMC
Tiarra Moore
tiarra.moore@ceismc.gatech.edu

Associate Director of School and
Community Engagement - CEISMC
Tamara Pearson
tamara.pearson@ceismc.gatech.edu

Senior Manager, Global CSR – Honeywell
Tammy Wolfe
Tammy.Wolfe@Honeywell.com

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General Tips for Mentors/Mentees

TIPS FOR MENTORS	TIPS FOR MENTEES
Maintain confidentiality to build trust.	
Manage expectations – this is a learning and development opportunity first and foremost.	Be candid and ask the questions that you need answered. Be honest about what you do and do not want to do.
Remember: a mentor always sets an example.	Let your mentor know how they can best help you, and show appreciation for your mentor.
Show respect.	
Expect a two-way learning relationship.	
Listen actively and empathetically.	
Use your own experiences, observations, and perspectives to impart information and skills, and encourage your mentee to apply the information and skills learned in ways that make sense to them.	Keep in mind that the teaching styles of each mentor may be different, so listen for the lessons and ask questions to help apply the lessons to your teaching practice.
Clearly communicate your goals, expectations, and commitments.	
Return phone calls, emails, etc. promptly.	
Communicate information in small chunks and avoid massive information dumps.	If your mentor is going too fast or sharing more information that you can digest, ask questions to slow down the conversation.
Do not expect that you will always have the answers to your mentee's questions and/or challenges. Introduce your mentee to other professionals in your network that can assist your mentee if necessary.	Do not expect your mentor to have all of the answers. Ask your Mentor to help you solve your problems, not solve them for you.
Share your successes and the challenges you faced in accomplishing your success.	
Find connections and similarities that extend beyond this experience.	
Honor your commitments and communicate quickly and candidly if you cannot honor your commitments in any way.	
Reach out to CEISMC if you need help.	

Being a Positive Mentor
Your Role

The following tips are from the "Peer Mentor Handbook" produced by The Mentoring Partnership of Southwester PA (www.mentoringpittsburgh.org). These represent a great way to frame your role and expectations as a mentor that will result in a positive outcome. While the suggestions here are targeted towards peer mentors, they are true of nearly all mentoring partnerships.

Your Role as a Peer Mentor:

Model Behavior

What you do is as important as what you say. Use your behavior to promote learning and positive development in your mentee.

Create Learning Experiences

Keep an eye out for teachable moments. Take advantage of local resources to cultivate their existing interests.

Focus on the Positive

Approach challenges from a place of optimism and possibility.

Encourage

Help your mentee build self-esteem and self-confidence.

A Note On Self-Esteem

Self-esteem is a **sense of confidence** in oneself, and a feeling of connectedness to others. A person's **emotional well-being** is often built upon their level of self-esteem. Self-esteem is an internal negotiation between our own self-image, our beliefs about how others view us, and the ideal version of the self we would like to be.

Building self-esteem is a crucial part of being a peer mentor. Try to pay attention to your mentee's self-esteem throughout your relationship, particularly when tough issues arise.

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Being a Positive Mentor (cont.)
Having Positive Expectations

These guidelines, also from the "Peer Mentor Handbook," reflect on what are some realistic expectations for any mentoring partnership.

Great Expectations

While it's great to have goals that you and your mentee can work towards, it's important to remember that the purpose of mentoring is to **build a relationship**. Your primary mission should be to establish trust and to be a supportive role model in your mentee's life.

It's also important to keep in mind that the goals you work toward should come from your mentee. If you have goals for your time together, try to focus them on yourself within your role – to improve your listening skills, to become solution-oriented, or to be the best mentor you can be.

As a Peer Mentor…

Do **Expect…**	Do NOT **Expect…**
· To be a positive role model to your mentee	· To "reform" or "save" your mentee
· The relationship to be one-directional, at least to start	· Your mentee to confide in you or trust you, at least to start
· Some change to happen	· Great change quickly
· To support your mentee in reaching their goals	· Your goals to mirror your mentee's goals for themselves
· To experience some frustration as a mentor	· That you will be "best-friends-at-first-sight"
· To be busy	· Your mentee to schedule meetings or to develop plans
· To make some impact in your mentee's life	· To know about or understand the impact you have made

Communication Tools

The following tips are from the "Peer Mentor Handbook" produced by The Mentoring Partnership of Southwester PA (www.mentoringpittsburgh.org). Consider reviewing these useful suggestions as you communicate with your mentee.

Communication Tools

1. Open and Close- Ended Questions

It might be a little tough to get conversation started when you are first getting to know your mentee. Asking open- ended questions is a great way to get the ball rolling.

A **close- ended** question is a question that can be answered very simply - generally with just **one word**, such as 'yes' or 'no'.
Example: Do you like ice cream?

Open- ended questions, on the other hand, tend to elicit lengthier responses. They help us ask others about their **opinions** and **feelings** and they can often lead the way to deeper conversation.
Example: How did you meet your best friend?
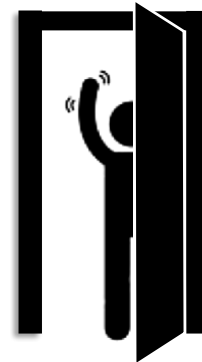
2. Active Listening

Active listening is a way of listening that affirms the speaker and lets them know that you are interested and that you understand.

To practice active listening, try out the following tips:
- **Paraphrase** what your mentee has said to make sure you understand. Say, "What I'm hearing is... Do I have that right?"
- Lean in, nod, and maintain eye contact. Use appropriate facial expressions and gestures. Keep a calm and **composed posture** and don't fiddle with anything that could distract you (phone).
- While your mentee is speaking, don't think about your response or the next question you want to ask. **Just listen**.

3. Body Language

Body language refers to all of the ways that we communicate with others without using words. According to research, nonverbal (body) language accounts for up to 70% of all communication! It is very important, therefore, to make sure you are sending the right messages to your mentee with your body language.

A few good tips for good body language are listed under "Active Listening," such as leaning forward and maintaining eye contact. Also **pay attention to your posture** when interacting with your mentee, which might send them signals about your mood, your interest in them, and your trustworthiness. Try to keep your body open and relaxed, with arms loose and uncrossed.

Communication Tools (cont.)

4. "I" Statements

"I" statements are sentences that start with an expression of your **personal opinion or experience**. You can only be sure of your own experiences and feelings – never those of others. Using an "I" statement to clarify where your opinions come from **ensures that you don't offend anyone** by speaking *for* them.

> Example: Instead of saying "**You** hate math!" try saying something like "**I noticed that you** seemed frustrated while doing your math homework the other day, could you tell me about that?"

Using "I" statements can be particularly useful during a conflict. Instead of sounding accusatory, which could make things worse, it will help you **understand your mentee's perspectives**.

> Example: Instead of saying "**You**'re so irresponsible! **You** let me down," try saying "**I was** really looking forward to spending time with you the other day and **I was** upset when you didn't show up. Why weren't you able to make it?"

As you can see, **"I" statements enable you to learn** about your mentee. The first "you" statement in each example only shows the mentor's assumptions about the mentee. Nothing is learned and conversation is turned into a conflict.

5. Giving Feedback

Feedback is an observation or opinion communicated from one person to another. Feedback can be positive or negative, and when done appropriate both types can be constructive and useful.

When providing feedback to your mentee, try to follow these guidelines:

- **Be honest and respectful**. Keep in mind that it can be difficult to hear negative feedback.
- **Make observations, not evaluations**. Provide examples of what you have observed when you give feedback - don't evaluate or provide personal judgment. Observations will help your mentee replicate good behaviors and recognize behaviors that aren't constructive.
- **Provide empathy**. Try your best to put yourself in their shoes to understand their perspectives.
- **Be timely**. Give feedback privately when you won't be disturbed or distracted and your mentee won't be embarrassed.

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Setting S.M.A.R.T. Goals

You may have heard of the "S.M.A.R.T." system of establishing goals before, but if not, this helpful document from the University of Riverside California (ucr.edu) describes the process.
- **Printable Link (for reference only)**: http://wellness.ucr.edu/Smart%20Goals.pdf

How to Make S.M.A.R.T. Goals

Specific: *Clearly state what you want to accomplish.*
- Try to answer WHO, WHERE, WHEN, WHY, and HOW:
    o **Who** is involved?
    o **Where** will I accomplish my goal?
    o **When** will I try to reach my goal?
    o **Why** do I want to reach this goal?
    o **How** will I go about reaching this goal? **How** will I work around barriers?
- *General goal*: "I want to exercise and get in shape." ✗
- *Specific goal*: "I will walk on the treadmill at the gym three times per week at 7 a.m. to get in better shape." ✔

Measurable: *Make sure to track your progress.*
- To determine if your goal is measurable, answer the following questions:
    o How much? How many?
    o How will I know when my goal has been reached?
- *General goal*: "I want to lose weight." ✗
- *Measurable goal*: "I want to lose 10 lbs in 2 months." ✔

Action-Oriented: *Know what actions you need to take to reach this goal.*
- *General goal*: "I want to be less stressed." ✗
- *Action-oriented goal*: "I will attend a stress relief workshop on campus every Thursday." ✔

Realistic: *Think big but make sure it's possible!*
- *Unrealistic goal*: "I am going to stop eating all sweets and sugars." ✗
- *Realistic goal*: "I am going to limit dessert to twice per week." ✔

Timely: *Set a time limit for reaching your goal.*
- *General goal*: "I want to lose 10 lbs." ✗
- *Timely goal*: "I want to lose 10 lbs by May 1st." ✔

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Setting S.M.A.R.T. Goals (cont.)

SMART Goal-Writing

Specific:

- **Who** is involved: _____
- **Where** I will do this: _____
- **When** I will do this: _____
- **Why** I want to do this: _____
- **How** I will do this: _____

Therefore, my SPECIFIC goal is to:_____

_____

Measurable: I will track my progress by: _____

_____

Action-Oriented: **CHECK** – Is my goal action-oriented?   YES   ☐   NO   ☐

If no, rewrite: _____

_____

Realistic: **CHECK** – Is my goal realistic?   YES   ☐   NO   ☐

If no, rewrite: _____

_____

Timely: I will reach my goal by the following date:_____

Barriers, Solutions, and Rewards

My potential barriers are_____

_____

I will work around these barriers by _____

_____

My healthy reward will be_____

_____

Problem-Based Learning Tips

As part of the Honeywell Student STEM Challenge, students will be engaged in a learning style different than that of traditional classroom instruction. Rather than having information directly imparted to them (also known as "direct instruction"), students will be discovering new learning material as they progress through the STEM Challenge directives, both by means of facilitation by their teachers and also by their own initiatives. This way of learning is often called **"project" or "problem-based" learning**.

While many of your teacher mentees will be familiar with facilitating learning in this manner, they or you yourself may not. As such, a few tips on how to facilitate project/problem-based learning have been provided below. These tips were designed by the Concordia University-Portland's blog website (see this link for more: https://education.cu-portland.edu/blog/classroom-resources/project-based-learning-tips/).

1. Provide meaningful real-world connections

Teachers need to let students reach their own conclusions in project-based learning units. Having content goals is vital, but you also need to tie your project-based learning units to the world beyond your classroom. Let's say your primary objective is for students to explain how solar power works. That's great, but they'll understand the content on a deeper level if you give students a real-world objective.

How about having them demonstrate the benefits of solar power for a teenager in California vs. one in Kenya? The age-old question of "why do we have to learn this?" suddenly gets answered in a much more meaningful way. Students can appreciate how solar power works, why it's so important and how it helps people in different ways depending on where they live and their socioeconomic status.

Grounding a unit in reality conveys a sense of urgency while encouraging curiosity, awareness and even emotional growth.

2. Build in time for experiential learning

It's easy to list a bunch of tasks to be completed, but it's important to make sure time is built in for experiential learning components where students have to test something and experience trial and error. Lessons learned from failed attempts are just as valuable as realizations at the moment of success.

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Problem-Based Learning (cont.)

If there isn't time for hands-on learning — say they have to build a sailboat model based on lessons about buoyancy, movement and stability — then the unit becomes more about checking off items on a list. It's much better for them to experience what it's like to apply concepts to effectively construct something and revise based on their mistakes.

3. Provide opportunities for team building

To boost engagement and class connectedness, give students the opportunity to work together creatively so each one can voice opinions and test ideas. Students can learn from each other and build their confidence as investigators and observers — instead of solely relying on you as the "sage on the stage."

4. Revisit the driving question

It's important to revisit the driving question of your project-based learning unit as you plan and execute each stage. If your driving question isn't the force propelling everything, you'll find yourself having to change course to keep it all clearly aligned.

Sticking to the driving question ensures that the meaning behind the unit doesn't get lost, that your rubric fully assesses your primary objectives, and that students stay attuned to the unit's focus and reward.

5. Differentiate through teams

Make sure to strategically group students to ensure the type of success you know they need. You might want to differentiate based on academic ability, collaboration skills, specific interests or social-emotional needs.

This gives students the best chance to learn the material in ways that best fit them. That, in turn, helps them feel personal and academic success within the group.

6. Focus on student-driven learning

Once your project-based learning unit is under way, remember students need this time to learn and explore within your framework. Trust that they are capable of making it work, and rest

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Problem-Based Learning (cont.)

assured that stepping back to see what works well and what needs to be slightly altered is all part of the process.

If you give them answers or show them how to do too much, they will lose sight of their own problem-solving abilities. It will feel more like a lesson you are teaching them rather than a series of experiences to work through with you as a guide.

7. Include self-assessment

Self-assessment and reflections often get shoved aside when we're short on time, but they provide valuable insight and focus on growth. Asking students to assess their work and performance as helpful teammates, leaders, observers and collaborators encourages accountability and introspection.

This can happen midway and at the end of the unit so they have an opportunity to apply what they've realized during the unit and for future units. If reflections become routine, students often learn to recognize how they have improved and appreciate that there are many kinds of success.

8. Reflect on your progress

Although it can be difficult to set aside grading and planning long enough to write your own reflections at the end of a unit, it is crucial to future success. Write down things like:

- what went well at each stage
- any surprises or struggles you didn't anticipate
- how to improve pacing and tighten the assessments
- how to more closely align each stage with the main objectives and the driving question

These reflections help you fine-tune each project-based learning unit so that it gets better each time and your students get the biggest possible gain from the experience.