More than SEMI-prepared for work and life!

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Host Organization: SEMI Foundation

ETP Type: *(classroom or PD; distance learning, hybrid or in-person)*

Subject/Grade: Middle school English

ETP Section Guide · Rubric and Checkbric · Published ETPs
ETP Review Prompts
Active STEM Learning and 21st Century Skills

Abstract (~150 words)

Students with special education services, particularly students with learning disabilities, need more opportunities to practice and to develop their soft skills (adaptability, active listening, communication, creative thinking, teamwork, and time management). Also, these students do not always have a clear idea of how their academic skills can translate to future jobs including careers in the semiconductor industry. With this series of activities, students will learn and practice soft skills using the Habits of Mind traits, in addition to learning about jobs in the semiconductor industry. The student teams will read short, but informative articles based on real-life, semiconductor-related workers. Correctly discovering the assigned semiconductor job involves examining the information and documenting their findings by filling out a job profile paragraph (cloze notes form). Also, teams must practice key soft skills in order to complete all of the required tasks that include building microchips, and matching their assigned semiconductor job to the related soft skills and photos.

Focal Content & Supporting Practices

Reading Standards for Informational Text: Integration of Knowledge and Ideas

For 6th grade: CCSS.ELA-LITERACY.RI.6.8
Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

For 7th grade: CCSS.ELA-LITERACY.RI.7.8
Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.

For 8th grade: CCSS.ELA-LITERACY.RI.8.8
Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.

Supporting Practices:

- Reference to SEL skills
- Review of CCSS reading standards for informational text (varies by grade level, 6-8)
- Review of discussion frames including how to use them and why they help guide discussions
- Reflection on perseverance and resilience (a variety of shorter activities including an individualized pre-activity survey, and the post-activity reflection/survey)

21st Century Skills and Applications (1 - 2 bullets)

- Problem solving
- Communication and collaboration

Measurable Objective(s)

- Students practice their soft skills independently and in pairs (active listening, adaptability, communication, creative thinking, time management, teamwork) and demonstrate these soft skills as measured by a teacher-created rubric and self-surveys (pre- and post-activity) and including the use of discussion frames to guide verbal responses.
- Students are able to match job skills (including soft skills and technical skills) with specific jobs in the semiconductor industry. Students are able to learn about and to identify jobs within the semiconductor industry after completing the lesson and/or playing the game.

Formative Assessment(s)

- Qualitative: Identification of soft skills using a slide presentation and bingo cards
- Qualitative: Review of soft skills using a Habits of Mind survey (teacher-created)
- Quantitative: Pre-activity review of Habits of Mind (hands-on activity in pairs or threes)
- Qualitative: short journal about the semiconductor industry (with related video) with sentence starters

Summative Assessment(s)

- Qualitative: post-activity, informal survey tracking the overall student experience with the lesson/game including questions about use of soft skills and how they applied to the team and lesson activities as well as (end of unit)
- Quantitative: Rubric score for student teams including the team self-score rubric and the teacher rubric (Did the students apply their soft skills and 21st century skills effectively during the game? Did the student's team employ soft skills in order to complete the game successfully?)

Fellowship Description (300-500 words)

The SEMI Foundation supports the growth and development of workers in the semiconductor, microelectronics industry. SEMI Foundation provides multiple pathways for job seekers while focusing on increasing diversity in this industry, program development to support a variety of groups including veterans, educators, women, and adults looking to increase their skills in this industry.

My responsibilities at the SEMI Foundation included: conducting interviews with industry leaders in the semiconductor industry, developing lesson plans at the middle school level for foundation use, and coordinating and collaborating with a team of teachers to determine which elements of the semiconductor industry to showcase while synthesizing relevant information from our research and from the interviews with industry leaders.

Using the interviews for inspiration and content, my team determined the commonalities and themes among all of the interviewees. After that, we prepared lessons to encourage student inquiry, interest, and background knowledge of the semiconductor field. Jobs in the semiconductor industry that were described in the interviews included: project manager, mechanical engineer, process engineer, lithographic engineer, chemical engineer, senior applications lab manager, environmental health and safety engineer, senior technical program manager, executive vice president of managing operations, senior scientist for R&D and manufacturing, semiconductor technologist/technical lead, senior manager

of strategic initiatives, senior director of technology, executive vice president of technology development and manufacturing, and COO and co-founder.

My biggest takeaway from the fellowship is the significant impact of strong soft skills on the performance of any working team. All of the interviewees reported that the following soft skills helped to ensure their teams' success in the semiconductor industry: teamwork, communication, honesty, speaking and acting with clarity and precision, flexibility, and growth mindset. These soft skills served as a guide to developing this ETP while incorporating activities and lessons featuring the 16 Habits of Mind, traits that closely mirror the soft skills identified by the semiconductor leaders during their interviews.

Fellowship Connection to School/Classroom (300-500 words)

My integration of the fellowship into my school site and classroom includes:

- Distilling my experience as a fellow into some mini lessons and stories about the semiconductor industry to share with groups of students
- Transforming my learning about the semiconductor industry into a game that students can play while serving the dual purpose of supporting students with their development of soft skills and teaching them about the connection between their STEM/STEAM skills and the application of those skills to semiconductor jobs.
- Supporting my students' development of soft skills and Habits of Mind traits and showing them how to apply these soft skills to the semiconductor game activity and beyond the classroom.

Instructional Plan (This is the bulk of your ETP and may take several pages.)
Plan something that can be done in-person.

Day 1:
Direct instruction: 25-30 minutes

- **Starter activity:** Teacher shares a few items with the class including a jar of sand, a thin circle-shaped wafer, and a packet of colored circles (stapled together). Teacher shows the class the jar of sand and asks them to think about how the sand might be connected to this lesson about the semiconductor industry. Then, the teacher will show a picture of the sand next to a microchip (Sand to Silicon) and explain the connection between them. Teacher will pass out the circle-shaped wafer and colored circles to the students and have them take a look at the items while asking "How do you think these items are related to our everyday lives? Each of these items represents a material that is a key part of the technologies that we use every day including computers, cell phones, voice recognition, and more! Over the next few days, we will learn about the connection between these items and the semiconductor industry." **Additional background information (optional):** teacher describes the summer fellowship she experienced recently and her newfound knowledge and interest in the semiconductor field.
- Teacher introduces the soft skills lesson by asking the class: "How can soft skills help us now and in the future?" and presenting the Google Slides entitled "What Are Soft Skills?" (2-3 minutes) with a focus on 5 key soft skills (Habits of Mind traits) shown through the acronym CAT CAT. These are the soft skills that the teams will use during the game play on Days 2 and 3.
- Teacher reads each slide while students keep track of the information on their bingo cards. Prizes will be given for the first bingo and for the first blackout (15-20 minutes) (formative)
- Embedded in the Google Slides presentation is a short survey on Slide 5 (formative) that students will complete in class. (3-5 minutes)
- Teacher cues students to pick a partner and complete a Think-Pair-Share with two traits from the Habits of Mind short survey. The Think-Pair-Share instructions are embedded in "What are Soft Skills?"

Day 2:
Student engagement: 50 minutes

- Teacher sorts students into groups of 2-3 people. Each group will solve their puzzle quietly with no talking. Time allotted can vary depending on student need: approximately 3-5 minutes. Remind students that they must solve the puzzle together with no talking or written

communication. They can gesture or communicate non-verbally during this exercise. At the end, the small groups will fill out a quick soft skills sheet by circling each soft skill to indicate what helped their group succeed and solve the puzzle. (formative)

- Teacher gives a mini lesson on the semiconductor industry with a short video. After the video, the teacher shows the students the items from Day 1 (a jar of sand, a thin circle-shaped wafer, and a packet of colored circles) and asks students to think about the connection between these items and the semiconductor industry. Students break into pairs or threes and they are given the wafer and color circles to guide their discussion about the information in the video.
- Students complete a short journal (formative) that serves as their exit ticket for today (and the flip side includes a spot for them to record their team members' names and team name). (10 minutes)
- Teacher explains the main activity for this lesson, the More Than SEMI-Prepared Game. Students will work in small groups (2-3 students per group).
- Students join their small group teams and review the contents of the game envelope that includes the Profile Paragraph template, 2-3 article excerpts about this job, and a team task sheet with the list of tasks required to win the game. (30 minutes)

- The semiconductor jobs featured in this game are:
    - Chemical Engineer
    - Electrical Engineer
    - Process Engineer
    - Sales, Accounts, and Operations Manager
    - Senior Applications Lab Manager
    - Senior Technical Program Manager

- The SEMI-Prepared Game Map (the details about how the game is played and the steps each team must take). There is an optional gameboard/leaderboard that can be used in this lesson.
- Today, students will start working on Part 1 of the game that includes assigning a role to each student within the team and starting to read through their assigned job profiles and information included in the game envelope.
- At the end of class, the teacher should cue students to fill out the backside of their short journal with their team members' names and team name. Teacher collects the exit tickets as students leave at the end of class. The exit tickets will be saved for Day 3 so students know which team they are joining. (5 minutes)

Day 3:
Student engagement: 50 minutes

- Class will rewatch the short video about the semiconductor industry and chips. Teacher will lead a discussion and the class will contribute to filling out cloze notes together on a Smartboard or whiteboard.
- Students gather in groups and determine each student's role in the team. Role badges are in the team envelope.
- Students continue to play the More Than SEMI-Prepared game in their teams. Teams will use the Game Jobs List to help verify their assigned semiconductor job. Once they have identified the job featured in their game envelope, they must present the completed Profile Paragraph to the teacher for verification and initials before moving on to the station activities (35 minutes)
- Teacher reviews each station activity with the whole class before starting the activities.
- As the students complete each station activity, the teacher will project the leaderboard onto the Smartboard or similar technology (or, low-tech, the leaderboard can be shown on an easel and update the teams' progress)
- Teams that have completed the game will fill out a student rubric rating their work together (summative reflection) and turn in the rubric to their teacher.

Day 4:
Student engagement: 50 minutes

- Teacher hands out Habits of Minds (8x11) trait cards (summative), one per team. Each team must review the trait card they receive and design a short presentation showcasing the traits they received. They can choose to act out the traits with a short skit. They can draw a quick poster. Teacher will hand out a list of presentation options. (20-25 minutes) The small group with

the best presentation wins an additional prize.
- Informal survey (summative) of the whole class to gather information and feedback on this lesson. One option is to use Plickers (a polling app with cards that students hold up a certain way to participate and to give their opinion). The survey includes a few questions about soft skills as they apply to the team activities. Another option is to hand out a paper survey. (summative)
- Teacher announces the winners of the game (every small group can win). Prizes vary depending on the following criteria: quickest solution, best teamwork, most helpful team, and most resourceful team. (10-15 minutes)

Follow-up:
- Teacher returns the completed rubrics to each team so the teams can review the feedback together. The whole class poll using Plickers will give automatic feedback to the entire class.

Additional Supports

Tools to meet the needs of all learners (SEL, distance learning, ELL, SPED)

- Recordings or other audio support for students with EL or SPED services
- Discussion frames for all students, but especially for students with EL or SPED services
- Cloze notes or graphic organizers to support students with EL or SPED services
- Option to report out verbally instead of filling out the surveys or rating scales (with scribe support) for students with EL or SPED services
- All soft copies available as a Google Slides activity for students in DL, hybrid, or students who need support visually
- Handouts available in larger print for students with visual disabilities

Materials

Include links to all files within this ETP

- Sand to Silicon image for Day 1 starter activity
- Google Slides presentation entitled "What are Soft Skills?":
- Paper copies of the Soft Skills pre-activity survey (Habits of Mind) OR Google Forms version
- Bingo cards for the Soft Skills activity on Day 1
- Puzzle piece matching activity for Day 2
- Short video about the semiconductor industry and microchips for Day 2
- Short journal for Day 2
- Semiconductor job profiles and information documents
- Semiconductor Job Profile Paragraph Template
- Semi-Prepared Game Map
- Role badges, one of each team member
- Team task sheet (enough copies for all of the teams plus extras)
- Team Station activities
- Team rubric--student version
- Team rubric summative reflection--teacher version
- Habits of Mind trait cards presentation options for Day 4
- Habits of Mind trait cards
- Habits of Mind chart with the 16 traits (laminated class set...may use as a bingo chart!)
- Game board and accessories for the More Than SEMI-Prepared Game
  Accessories include: envelopes with instructions and details about assigned semiconductor jobs, and the team task sheet that helps each team navigate through the game.
- Post-activity survey (in paper form or on Plickers)
- Prizes including Calm Strips, additional quiet fidgets, non-food prizes

References

Chemical Engineering (n.d.) www.acs.org/content/acs/en/careers/chemical-sciences/areas/chemical-engineering.html. Accessed 26 July 2021.

Doyle, Alison. "Soft Skills: What Are They?. The Balance Careers, 26 September 2020. www.thebalancecareers.com/what-are-soft-skills-2060852. Accessed 30 June 2021.

Gagnon, Danielle. "What Does an Electrical Engineer Do?" Southern New Hampshire U, 23 June 2020. www.snhu.edu/about-us/newsroom/2018/10/what-do-electrical-engineers-do Accessed 26 July 2021.

Program Manager Job Description, and More, Western Governors U, 26 October 2020. www.wgu.edu/blog/program-manager-job-description-salary2010.html#close. Accessed 27 July 2021.

Lab Manager job posting at Stanford (n.d.). https://careers.insidehighered.com/job/2149388/lab-manager/ Accessed 26 July 2021

Occupational Outlook Handbook: Chemical Engineers, 9 April 2021. www.bls.gov/ooh/architecture-and-engineering/chemical-engineers.htm. Accessed 16 July 2021.

O'Connor, Scott. "What Are the Requirements to Become a Lab Manager?" Northeastern U, 10 September 2020. www.northeastern.edu/graduate/blog/lab-manager-requirements/ Accessed 26 July 2021.

Process Engineer Job Description: Top Duties and Qualifications (n.d.). www.indeed.com/hire/job-description/process-engineer?gclid=Cj0KCQjw0emHBhC1ARIsAL1QGNdhyMMno1p84uDmk4YVvi-l6CHokgaNJFYDuzJ3_TFIMb9dJ_6qVxQaAoCHEALw_wcB&aceid= Accessed 23 July 2021

Rosenberg McKay, Dawn. "What Does an Electrical Engineer Do?" *The Balance Careers*, 22 August 2019. www.thebalancecareers.com/career-facts-electrical-engineers-4126615 Accessed 16 July 2021,

Sales Operations Manager Job Description (n.d.). www.glassdoor.com/Job-Descriptions/Sales-Operations-Manager.htm Accessed 26 July 2021.

Sales Operations Manager Job posting for Google (n.d.). www.indeed.com/q-Sales-Operations-Manager-jobs.html?vjk=d3bc5f6ad7348c25 Accessed 26 July 2021.

Sand/Ingot image (n.d.) blogs.intel.com/jobs/files/2012/02/S2S_1.png Accessed 30 July 2021.

Senior Technical Program Manager Overview (n.d.), www.zippia.com/senior-technical-program-manager-jobs/ Accessed 27 July 2021.

TeachThought Staff. "What are the Habits of Mind?"Habits of Mind icons and definitions. Teach Thought (n.d.), www.teachthought.com/pedagogy/what-are-the-habits-of-mind/. Accessed 23 June 2021.

What is Process Engineering? (n.d.) www.srgtalent.com/career-advice/roles-in-

focus/process-engineering Accessed 23 July 2021
Woodford, Chris. “How You Make a Microchip-a quick summary.” *ExplainThatStuff!*, 29 July 2020. www.explainthatstuff.com/integratedcircuits.html.

Keywords

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