Student Teaching Practicum at Worcester Technical High School

An Interactive Qualifying Project
Submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the
DEGREE OF BACHELOR OF SCIENCE

Benjamin Petkie 2021

Abstract

My student teaching in 2021 began in the midst of the COVID 19 virus, which was a very unique scenario to complete my practicum. I delivered lessons both online and in-person which required me to create lesson plans could be taught virtually or hybrid. A majority of my time was spent refining these lesson plans to the point I felt comfortable teaching. In order to obtain my Massachusetts teaching license, I followed the Candidate Assessment of Performance (CAP) cycle. Some aspects of the program included demonstrating my skills in six key areas which were, content knowledge, reflective practice, safe learning environment, meeting diverse needs, well-structured lessons, and High Expectations. I was required to meet at least the needs improvement evaluation in all of these sections but generally scored as Proficient. Through this experience I had a Supervising Practitioner, Thomas Noviello, who was in charge of assessing my teaching ability. He also collaborated with my Mentor Teacher Jackie Kalisz to evaluate if I was ready to obtain my teaching license. To detail my student teaching experience, I created an online e-portfolio to display information about Worcester Tech and the students, but also lesson plans and how I adhered to each of these CAP Elements.

Acknowledgements

The COVID pandemic made this project more difficult for not only myself but those supervising me, without their continual support and contact (in person and virtually) I would not have had nearly the same experience. My supervising practitioner (Thomas Noviello) did a fantastic job staying in contact and evaluating my progress, his observations were always unintrusive and gave great constructive criticism, thank you TJ! My mentor teacher Jackie Kalisz was such a great part of my practicum, her energy and support really helped show me how great it can be to be a teacher. Not only this but her feedback was beyond helpful and she has been so pivotal in shaping me into a great teacher, thank you Jackie! Melenith Rivera was the Classroom Assistant for the SPS/ELL student in the classroom, without her support the entire experience would have been at least a notch or two up in the stress category. Finally, Shari Weaver, Jacklyn Bonneau, and Terri Gerhardt (from the WPI STEM education center) offered great materials and seminars to help us through the struggles of the practicum which helped relieve some tension that builds up with teaching.

Table of Contents

I created a website (e portfolio) to showcase all I learned during my project. A table of contents is located below, and this link can be followed to view the site:

https://sites.google.com/view/petkieteachingpracticum/home?authuser=0

Adjustments to practice	The definition of the *Adjustments to practice* CAP element along with how I achieve this in my classroom supplemented by evidence
High Expectations	The definition of the *High Expectations* CAP element along with how I achieve this in my classroom supplemented by evidence
Reflective Practice	The definition of the *Reflective Practice* CAP element along with how I achieve this in my classroom supplemented by evidence
Appendices	An appendix of some of the instructional material used during my teaching practicum
References	Cited references utilized to create the e portfolio

Lesson Plan

Lesson Plan Title: Conservation of Thermal Energy

Teacher's Name: Benjamin Petkie **Subject/Course:** Physics
Unit: Thermodynamics. **Grade Level:** 10/11

Overview of and Motivation for Lesson:

Introduce students to thermodynamics including the first law and how that relates to conservation of energy. Students will identify that energy is still conserved no matter what form it takes (thermal in this case). Types of energy will be overviewed to strengthen understanding of conservation.

Stage 1-Desired Results	
Standard(s): • · · HS-PS3-1. Use algebraic expressions and the principle of energy conservation to calculate the change in energy of one component of a system when the change in energy of the other component(s) of the system, as well as the total energy of the system including any energy entering or leaving the system, is known. Identify any transformations from one form of energy to another, including thermal, kinetic, gravitational, magnetic, or electrical energy, in the system. • ○ Clarification Statement: • Systems should be limited to two or three components and to thermal energy; kinetic energy; or the energies in gravitational, magnetic, or electric fields.	
Aim/Essential Question: • What is the definition of heat? • What is the definition of temperature? • What is the first law of thermodynamics? • Is energy conserved in a thermal energy transition? • What are the 5 different types of energy?	
Understanding(s): *Students will understand that . . .* • Heat is the transfer of thermal energy where temperature is the measure of total KE of system • Energy is not created or destroyed which also applies to thermodynamics, this is explained by the first and second law of thermodynamics • The 5 types of energy are: Light, electrical, chemical, mechanical, and thermal and we can transfer between these forms	
Content Objectives: *Students will be able to . . .* • Identify that energy is not created or destroyed only transferred and that this also applies to thermodynamics • Identify an unknown in the 1st law equation ΔU=Q-W	**Language Objectives:** ELD Level Choose an item. *Students will be able to . . . in English* • Click here to enter text. ELD Level Choose an item. *Students will be able to . . . in English*

	• Click here to enter text.

Key Vocabulary

- heat
- temperature
- thermal equilibrium
- energy conservation
- thermal energy
- mechanical energy
- Chemical energy
- Light energy
- Electrical energy

Stage 2-Assessment Evidence

Performance Task or Key Evidence

- WS on heat transfer and thermodynamic's first law at end of class/HW

Key Criteria to measure Performance Task or Key Evidence

- Participation in interactive peardeck
- WS solutions

Stage 3- Learning Plan

Learning Activities:

Do Now/Bell Ringer/Opener: Play the history of thermodynamics crash course and have students fill out the form while we are doing it: (15 min)
https://www.youtube.com/watch?v=VpiLucwH-AQ
https://docs.google.com/forms/d/1WGkkmCEeDFF5cOPXX5iWcYV80YLuJh5bUR5fIvOORpM/edit

Learning Activity 1:
Peardeck interactive slideshow including definitions of heat and temperature and overview of the first law of thermodynamics. Heat is explained to be the transfer of thermal energy where temperature is a measure of the Kinetic Energy of the system. This relates to conservation of energy and that transfer between types of energy is still conserved no matter what form it is. The first law of thermodynamics tells us the change in energy of a system is heat applied to the system minus the work done by the system on its environment.(20 min)

Learning Activity 2:
Overview of types of energy including electrical, light, mechanical, chemical, and thermal. The students will write down the definitions as they will be important for tomorrow's lab. Energy flow systems will be explored and students will be able to identify either the magnitude of the change in the system's energy, or the amount of heat added or work done by the system. (25 min)

Application

WS on types of heat transfer and conservation, started in breakout rooms and to be finished for homework (10 min)

Summary/Closing
Finish the WS!

Multiple Intelligences Addressed:

☐ Linguistic ☐ Logical-Mathematical ☐ Musical ☐ Bodily-kinesthetic
☐ Spatial ☐ Interpersonal ☐ Intrapersonal ☐ Naturalistic

Student Grouping

☐ Whole Class ☐ Small Group ☐ Pairs ☐ Individual

Instructional Delivery Methods

☐ Teacher Modeling/Demonstration ☐ Lecture ☐ Discussion
☐ Cooperative Learning ☐ Centers ☐ Problem Solving
☐ Independent Projects

Accommodations	**Modifications**
Breakout room with struggling students with me, self sufficient students with Ms. Kalisz during work time	N/A

Homework/Extension Activities:
Finish heat transfer WS

Materials and Equipment Needed:

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

References

Werra, E. (2018, July 12). *Maslow and the Modern Learning Environment*. Advancing K12. https://www.skyward.com/discover/blog/skyward-blogs/skyward-executive-blog/july-2018/maslow-learning-motivation.

Klein, A. (2020, December 7). *No Child Left Behind: An Overview*. Education Week. https://www.edweek.org/policy-politics/no-child-left-behind-an-overview/2015/04.

Every Student Succeeds Act (ESSA). Every Student Succeeds Act (ESSA) | U.S. Department of Education. (n.d.). https://www.ed.gov/essa.

Massachusetts School and District Profiles. Contact Information - Worcester Technical High (03480605). (n.d.). https://profiles.doe.mass.edu/general/general.aspx?topNavID=1&leftNavId=100&orgcode=03480605&orgtypecode=6.

Tomlinson, C. and McTighe, T. (2006). Integrating Differentiated Instruction and Understanding by design. Alexandria,VA: ASCD

Home. Worcester Technical High School. (n.d.). https://techhigh.us/.