MYP Unit Planner

Unit Title: Introduction to Design - Introduction to Engineering Design

Teacher(s)	Subject and Grade Level	Time frame and Duration
Miner, Michelle C	Technology , High School	(Week 1, 5 Weeks)

Significant Concept (Enduring Understanding)

Constraints drive Creativity.

Content Knowledge / Big Ideas	Skills
1.1 - Introduction to a Design Process	1.1 - Introduction to a Design Process
1. There are many design processes that guide professionals in developing solutions to problems. 2. A design process most used by engineers includes defining a problem, brainstorming, researching, identifying requirements, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing, refining, making, and communicating results. 3. Design teams use brainstorming techniques to generate large numbers of ideas in short time periods. 4. Engineers conduct research to develop their knowledge base, stimulate creative ideas, and make informed decisions. 5. A designer uses an engineer's notebook to chronologically document all aspects of a design project.	1. I can apply engineering notebook standards and protocols when documenting their work during the school year. 2. I can identify and apply group brainstorming techniques and the rules associated with brainstorming. 3. I can research a product's history, develop a PowerPoint presentation, list chronologically the major innovations to a product, and present findings to a group. 4. I can use online and published works to research aspects of design problems. 5. I can identify the design process steps used in given scenarios and be able to list the steps, if any are missing.

Approaches to Learning

ATL Skill & Student Learning Outcome

Organization **Information** **Thinking** Student will learn to research, design and
Collaboration **Literacy** **Transfer** communicate ideas to their peers.
Communication **Reflection**

- Literacy
- Being informed
- Informing others

MYP Area of Interaction Focus / DP ToK Links

ATL - How can I access information? How can I better communicate my understanding?
Env - How can we make informed and responsible choices? What are the lifestyle implications of making these choices?

Unit Question (Essential Question)

How can constraints/critera effect the design process and the evolution of a product?

Unit Questions
Why do we have measurement standards?
Why is sketching an important engineering skill?
Why would a designer use a statistatical analysis of a product?
Why would a designer create a prototype?

FROM ASSESSMENT TO TEACHING AND LEARNING ACTIVITIES THROUGH INQUIRY

Assessment Reflections

- What exemplars will students see so that they understand what is required?
- What will allow students the opportunity to answer the unit question using what they have learned?
- What considerations have you given the nature of the assessment (e.g. given in class, take-home, time allowed for completion)
- At what level of Bloom's Taxonomy does this task ask the student to engage?
- Where in the assessment task(s) are students invited to achieve at all levels of the descriptors?

What MYP task will be most appropriate?

Assessments

Weekly Process Journal Check
Formative: Process Journal
Students will turn in their process journals - I will check to make sure they are writing down the learning targets, and any questions they are having. From there I can help students as needed.

Activitiy 1.1.1 Coffee Cup
Formative: Investigation

Product Evolution
Summative: Project
Students investigate and present about the evolution of a consumer product.

MN Standards & IB Objectives

-Minnesota State Standards or National Standards that are being addressed
-Which MYP assessment criteria will be used?

MYP: Technology (For use from Sept. 2006/Jan. 2007), MYP Year 5, Assessment Criteria
Criterion A: Investigate

- The student explains the problem, discussing its relevance.
- The student critically investigates the problem, evaluating information from a broad range of appropriate, acknowledged sources.
- The student describes detailed methods for appropriate testing to evaluate the product/solution against the design specification.

Criterion B: Design

- The student generates a range of feasible designs, each evaluated against the design specification.
- The student justifies the chosen design and evaluates it fully and critically against the design specification.

Criterion C: Plan

- The student produces a plan that contains a number of detailed, logical steps that describe the use of resources and time.
- The student critically evaluates the plan and justifies any modifications to the design.

Criterion D: Create

- The student competently uses appropriate techniques and equipment.
- The student follows the plan and justifies any modifications made, resulting in a product/solution of appropriate quality using the resources available.

Criterion E: Evaluate

- The student evaluates the success of the product/solution in an objective manner based on the results of testing, and the views of the intended users.
- The student provides an evaluation of his or her own performance at each stage of the design cycle and suggests improvements.
- The student provides an appropriate evaluation of the impact of the product/solution on life, society and/or the environment.

Criterion F: Attitudes in technology

- The student consistently displays a satisfactory standard in both of the aspects:
  -personal engagement (motivation, independence, general positive attitude)
  -attitudes towards safety, cooperation and respect for others.

-Which MYP objectives will be addressed during this unit?

LEARNING EXPERIENCES AND TEACHING

- How will I incorporate international mindedness throughout the unit?
- How will students learn the knowledge and practice the skills required?
- How will we use formative assessment to give students feedback during the unit?

Learning Activities

1.1 Introduction to a Design Process
W- The teacher will present **Concepts**, **Key Terms**, and **Essential Questions**, in order to provide a lesson overview. Students will apply their knowledge of research, the design process, and documentation in the critique of a product that they use everyday, such as a cell phone or MP3 player.

H - Videos: Computer History/Humor w/ John Cleese (1982 commercial) vs. eee machine portable laptop comercial. Discussion on the evolution of the laptop computer.

E- The teacher will distribute **Sample Engineer's Notebook Entries** to each student and discuss what constitutes acceptable and unacceptable entries.
· The teacher will present **Engineer's Notebook.ppt.**

- What different teaching methodologies will we employ?
- How are we differentiating teaching and learning for all?

· Students will take notes in their journals while the teacher makes the presentation.
· Students will be advised to keep work for the creation of portfolios. Portfolios will be discussed in Lesson 1.4

· The teacher will identify two or three major inventions that have made life easier, such as the automobile and telephone, to stimulate class discussion.
· The teacher will distribute and introduce **Activity 1.1.1 Beverage Container.**
· The teacher will present the **Rules for Brainstorming.ppt**.
· Students will begin work on Activity 1.1.1 Beverage Container.
· **Note:** The teacher may have other common objects to show that will offer students different experiences in learning about the parts of the design process in an impromptu way.
· The teacher may want to provide graph paper for the sketching located in the **Teacher Guidelines** located at the end of this lesson.
· The teacher will serve as a facilitator and keep students on task by offering cues and reiterating the problem statement.
· Students will present Activity 1.1.1 Beverage Container ideas to the class.
· The teacher will lead a discussion using the steps in the design process and possible constraints that would have to be addressed when redesigning the item. Refer to the **Teacher Notes** for a detailed explanation**.**
Day 4 - 6:
· The teacher will present the **Evolution of Product Design.ppt.**
· Students will take notes in their journals.
· The teacher will introduce and distribute **Activity 1.1.2 Product Evolution** and **Activity 1.1.2 Product Evolution Rubric.**Students will begin work on Activity 1.1.2 Product Evolution using an approved product from their hobby or interest.

· Students will deliver their PowerPoint presentations to the class.

· The teacher will distribute **Example Design Process.**
· The teacher will present the **Design Process Overview.ppt.**

R - Students will participate in a teacher-led discussion on how society has changed because of a product or technology.

E - Students will evaluate their work according the the rubric throughout the process.

Differentiations

Made as needed according to student needs.

Modifications

According to IEP/504.

	Resources
ONGOING REFLECTIONS AND EVALUATION	
Students and Teachers ■ What did we find compelling? ■ What learner-initiated inquiries arose during the learning? ■ From the evidence, what understandings may have been constructed? ■ How did we deepen our understanding of AOI? ■ What opportunities exist for reflection - both on the unit and on our own learning? ■ What, if any, extension activities arose? Collaboration ■ How successful was the collaboration with other teachers within my subject group and/or form other subject groups? ■ What interdisciplinary, if any, understandings were forged with other units? Assessment ■ In what ways did the assessment task allow students to achieve at the highest descriptors? ■ How are skills that were taught articulating to the next level?	**Unit Reflections**

Data Collection

- What data am I collecting?
- For what purpose will the data be used?

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