



**Unit Title:** Documenting ROV building  
**Subject/target grade**  
Project documentation/grade levels 9-12

**Unit Summary:** the goal of this unit is to ensure that proper documentation of acquired skills and knowledge are transferred to the next class.

The unit covers how to develop an information system that documents the experience students gain while constructing a Remotely Operated Vehicle (ROV) as part of the marine robotics class.

When ROV's are built as part of the marine robotics class, experience is not efficiently transferred to other students (especially students in the next class) if proper documentation is not created. This unit teaches the basics of note taking, the development of a template (to streamline and improve the quality of data and to improve access to the data) and the use of pictures and videos in order to improve the quality documentation. The benefits are twofold:

- 1) Students will be more motivated and improve the quality of their documentation when they perceive their documentation efforts to be meaningful to other students.
- 2) The documentation will allow the teacher to focus on covering new territory instead of teaching topics that students could have found in the data-base.

This documentation may evolve into an Internet supported "virtual" data base that could become available to other schools working on similar projects. Contributions of other schools to the database may increase its quality and could be considered in the future.

**Michigan Content Expectations:**

CE 1.1.2 Know and use a variety of prewriting strategies to generate, focus, and organize ideas (e.g., free writing, clustering/mapping, talking with others, brainstorming, outlining, developing graphic organizers, taking notes, summarizing, paraphrasing).

CE 1.1.3 Select and use language that is appropriate (e.g., formal, informal, literary, or technical) for the purpose, audience, and context of the text, speech, or visual representation (e.g., letter to editor, proposal, poem, or digital story).

CE 1.1.5 Revise drafts to more fully and/or precisely convey meaning—drawing on response from others, self-reflection, and reading one's own work with the eye of a reader; then refine the text - deleting and/or reorganizing ideas, and addressing potential readers' questions

CE 1.3.1 Compose written, spoken, and/or multimedia compositions in a range of genres (e.g., personal narrative, biography, poem, fiction, drama, creative nonfiction, summary, literary analysis essay, research report, or work-related text): pieces that serve a variety of purposes (e.g., expressive, informative, creative, and persuasive) and that use a variety of organizational patterns (e.g., autobiography, free verse, dialogue, comparison/contrast, definition, or cause and effect).

CE 1.4.4 Interpret, synthesize, and evaluate information/findings in various print sources and media (e.g., fact and opinion, comprehensiveness of the evidence, bias, varied perspectives, motives and credibility of the author, date of publication) to draw conclusions and implications.

CE 1.5.4 Use technology tools (e.g. word processing, presentation and multimedia software) to produce polished written and multimedia work (e.g., literary and expository works, proposals, business presentations, advertisements).

**Learning Objectives:**

Students will be able to:

- Disseminate between important and not important information
- Summarize and describe processes in detailed steps
- Create a template to structure the note taking process
- Indicate which topics should be part of a good template that will help to improve documentation, ultimately leading to information that can become part of a functional database.
- Students will learn how to support procedures with pictures and video.

**Table of Lessons:**

<b>Lesson Title- Brief Description</b>	<b>Learning Objectives</b>	<b>Content Standards</b>	<b>Materials</b>
Lesson one Note taking.	Students will be able to take notes and understand why to take notes.	CE 1.1.2 Know and use a variety of prewriting strategies to generate, focus, and organize ideas (e.g., free writing, clustering/mapping, talking with others, brainstorming, outlining, developing graphic organizers, taking notes, summarizing, paraphrasing).	No special materials are needed.  Power Point lesson 1 “Journal Template The art of communicating”.
Lesson two Making and using a template for note taking.	Students will be able to: <ul style="list-style-type: none"> <li>- Describe the benefits of using a template</li> <li>- Make a template</li> <li>- Use a template</li> </ul>	CE 1.4.4 Interpret, synthesize, and evaluate information/findings in various print sources and media (e.g., fact and opinion, comprehensiveness of the evidence, bias, varied perspectives, motives and credibility of the author, date of publication) to draw conclusions and implications	No special materials are needed.  Power Point lesson 2 “Procedure template, Knowledge transfer”.  Video lesson 2 “Cameron camera housing”.
Lesson three Using pictures and video to support documentation.	Students be able to use video and pictures to support descriptive text.	CE 1.5.4 Use technology tools (e.g, word processing, presentation and multimedia software) to produce polished written and multimedia work (e.g., literary and expository works, proposals, business presentations, advertisements).	Digital camera with video capabilities needed.  Two YouTube videos or handout Photographs handout
Lesson four Final project, application of lessons 1, 2, and 3.	Students will be able to document a procedure.	CE 1.1.5 Revise drafts to more fully and/or precisely convey meaning—drawing on response from others, self-reflection, and reading one’s own work with the eye of a reader; then refine the text - deleting and/or reorganizing ideas, and addressing potential readers’ questions	Digital camera with video capabilities needed.  Grading rubric handout Student journal entries handout

**Safety Considerations:**

There are no special safety concerns or requirements in this unit.

**Evaluation Plan:**

The assessment of this unit will occur in lesson four, the final project. In this project students will improve an existing description (individually or in teams) of a procedure that was recorded without the use of a template. The improved documentation will need to give a clear description of the procedure, documented on the class template and be complete in its description.

A grading rubric is attached to the lesson plan.

**Resources (websites):**

**Note-Taking Skills: An Introduction**

This website explains how to take good notes.

<http://www.lc.unsw.edu.au/onlib/pdf/notetake.pdf>

**General note taking template**

This website give an example of a template for note taking and some tips

[http://lsc.cornell.edu/Sidebars/Study\\_Skills\\_Resources/cornellsystem.pdf](http://lsc.cornell.edu/Sidebars/Study_Skills_Resources/cornellsystem.pdf)

**Dartmouth academic skill center**

This website presents a very complete spectrum of information on note taking with documents, videos and assessment of ones note taking skills.

<http://www.dartmouth.edu/~acskills/success/notes.html>

**YouTube video on tips to Videotape and interview.**

This is a 10 minute video on how to video an interview

<https://www.youtube.com/watch?v=xybU26ZeB28>

**Brief description of how this unit relates to your graduate research. (1 page):**

In research note taking is important as experiments may need to be repeated months later and possibly by someone else. If good notes are available it is possible to repeat the experiments effectively and efficiently by using the gained experience in the initial work. At times experiments cannot be repeated making it even more important to document all useful information so it is available for later use.

We sampled Lake Superior in 2011 and 2012 every 2 weeks at 11 stations for multiple parameters on the Houghton North transect which extends 26 km offshore of the Keweenaw Peninsula, Mi. This has resulted in an extensive data-base, the overwhelming size makes it imperative to keep track of who did what, where, when, how and why. Therefore standard operating procedures were created including templates to record data.

Obtaining consistent high quality data calls for good and well documented methods as well. Efficiency of data analysis would have improved if all pertinent (meta) data was documented on one form. Some meta data needed to be collected by checking samples in storage, a long and inefficient process, which could have been prevented if this information was documented correctly.

Being able to document procedures and learned skills will help students to be more organized and perform better in school and in later careers.