

**Lesson 10- Project Management**

**Essential Question:** What are the elements that will help me organize the information we have gathered about our community to create our service-learning project plan?

**Standards**

**NGSS HS. Engineering Design**

Students who demonstrate understanding can:

**HS-ETS1-1.** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

**HS-ETS1-2.** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**HS-ETS1-3.** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

**ETS1.b- Developing Possible Solutions -** When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.

**The Common Core ELA Standard for Science and Technical Writing reads:**

**ELA/Literacy – SL.11-12.1d-** Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

**ELA/Literacy – SL.11-12.3-** Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.

**Materials**

- Multimedia presentation
- Student Sheets
- Student notebooks
- Student Exit Slips
- Teacher Reflection

Activities			
Activity	Name of the Activity	Photocopies	Materials
1	Preparation for Class - 1.3 and 1.8-Teacher Toolbox. Assigning Team rolls- 1.13 Teacher Toolbox- Roles and Responsibilities. Overview of the project.		Student page
2	Standards Statement (Option: Unpacking the standards Teacher toolbox 1.12- Unpacking the standards)	Student Sheet	PowerPoint Presentation Student sheet
3	Review elements of Project Management		PowerPoint <b>Student notebook with documents from previous lessons</b>
4	Review and refine the information gathered include in Project management sheet. Creating a PERT Chart		PowerPoint Presentation Project Charter Student sheet PERT Chart Example
5	Reflection and Formative Assessment	Student debrief slips	PowerPoint Presentation Notebook Formative Assessment Sheet

## Overview

Throughout the Service-Learning module, the students have been exploring their community and have a good compilation of qualitative and quantitative data about the demographics and needs of the community. They have:

- Collected information from the community to assess needs
- Created a Project Charter
- Made critical decisions about the needs of stakeholders

In this lesson, the students will be taking this information and further condensing it, looking to create a comprehensive project management document that will further guide the project.

## Major Concepts

- Project Management
- Project Objectives
- Project organization
- Project PERT Chart

## Objectives

Students will:

- Define the elements of project management
- Prioritize the tasks to determine the most efficient way of organizing the project.
- Evaluate and explain the tasks that need to be completed and determine the application of measurable criteria.
- Convert critical tasks into a PERT Chart.
- Continue to build notebooking reflection and teaming skills.

---

## Lesson Preparation

### Preparation

- **Lesson Preparation:** For specific directions on preparing lesson materials, see 1.3 and 1.8 documents in the Teacher Toolbox.
- **Instructional Resource:** Make sure that you have the *PowerPoint presentation* ready for class viewing.

---

## Procedure

### Activity 1: Preparation for the Class

**Multimedia Presentation:** This lesson will have a multimedia presentation that will help to get the students thinking about the lesson and walking them through the information. Download the presentation in the folder.



**Preparing the notebooks-** see document 1.3 in the Teacher Toolbox for specific instructions concerning notebooking.



**Team Roles and Responsibilities-** For more detailed information about team roles; use 1.13 Teacher Toolbox Team Roles and Responsibilities.

### Activity 2: Unpacking the Standards

**Class Explanation:** The students are compiling the information they have gathered to this point and realize that the engineering design process gives structure and information gathered through data is essential to a useful service-learning experience. They will be using the speaking and listening skills to further refine the design process to get an efficient project plan.

**Note to Teacher:** Look above to see the standards that will be addressed through this lesson. The students need to understand the focus of the lesson, so an examination of the standards is a way of addressing this lesson essential.

**Here is a possible Standard Statement which incorporates the standards used in this lesson:**

*Students will be using the speaking and listening skills to further refine the design process to get an efficient project plan.*

**Optional Lesson Component:** As an additional component for this lesson, you may use Teacher toolbox 1.12- *Unpacking the standards in a Student Centered Classroom*. This gives procedures to help your students create their own standards statement.

- Pass out the student sheets

### Activity 3: Review Elements of Project Management

**Note to teacher:** Through all of the information that the students have compiled they have completed an evaluation of tasks for the projects broken down into steps. They must now evaluate each of the tasks and steps and prioritize them and create measurable criteria to evaluate the tasks. The students will be doing that through a Specifications development phase. The goal of this segment is to understand “what” is needed in each part of the project by your community partner and by the end of the evaluation develop measurable criteria to evaluate the project design. This is accomplished by understanding the context of the project, the stakeholders, the requirements of the project and why the current solution does not meet the needs of the community.

#### Introduction:

**Engaging Prior Knowledge:** You have done a huge amount of research into the needs of the community and have identified potential projects that could be implemented. You are now taking your best option and evaluating each of the tasks and steps and prioritize them. You have used the information to create a specifications document with measurable criteria to evaluate the tasks and have created a flow chart for the task..

The goal of this segment is to understand the elements of effective project management and evaluate the work you have completed to this point.

#### In Groups Discussion:

**What is project management and what are the key questions that need to be addressed in the Project plan?**

1) **Use your student sheet and discuss these questions so you can better evaluate the information you have gathered thus far.**

Students will discuss this question using their student sheets and write the information on that document.

#### Information:

- **Project management** is the discipline of planning, organizing, motivating, and controlling resources to achieve specific goals.
  - **Starts with making plans** (the students have begun this process with the flow chart, the specifications document and the Project Charter planning.)
  - Tracking plans and making adjustments to achieve goals (this is what they are doing now with revisiting all of the information they have gathered and refining their plan.
- **Project Plans-** Students will need to address the following questions.
  - **What do you and/or your teams do first?**
  - **What should come next?** (The students will need to preliminarily work through this questions but will visit this further in 5.8 when the work through the decision matrix.
  - **How many people do you need to accomplish your project?**
  - **What resources do you need to accomplish your project?** Students will utilize their budget to help them determine the answer to this question.
  - **How long will it take?** When the students look at the planning sheet for the Project charter, they can revisit this and determine if the timeline is still accurate.
  - **What can you get completed by the end of the semester or quarter?**
  - **When will the project be finished?**
  - **How will we know we are done with the project?** Have the students revisit the specifications document where they have determined measurable criteria for the tasks in the project.

**Note to teacher:** Be sure to circulate around the room as the students discuss these elements so they have a clear understanding of how these elements applied to the project and the tasks applied, are essential to the success of the project.

**Whole Group: Groups will share important information with the group.**

- What decisions were made in your group about the tasks they have created and the SWOT decision model?
- Are there any threats to the success of the project that can be identified and a contingency plan be created to minimize the effect on the project?

### Activity 4: Create a Pert Chart,

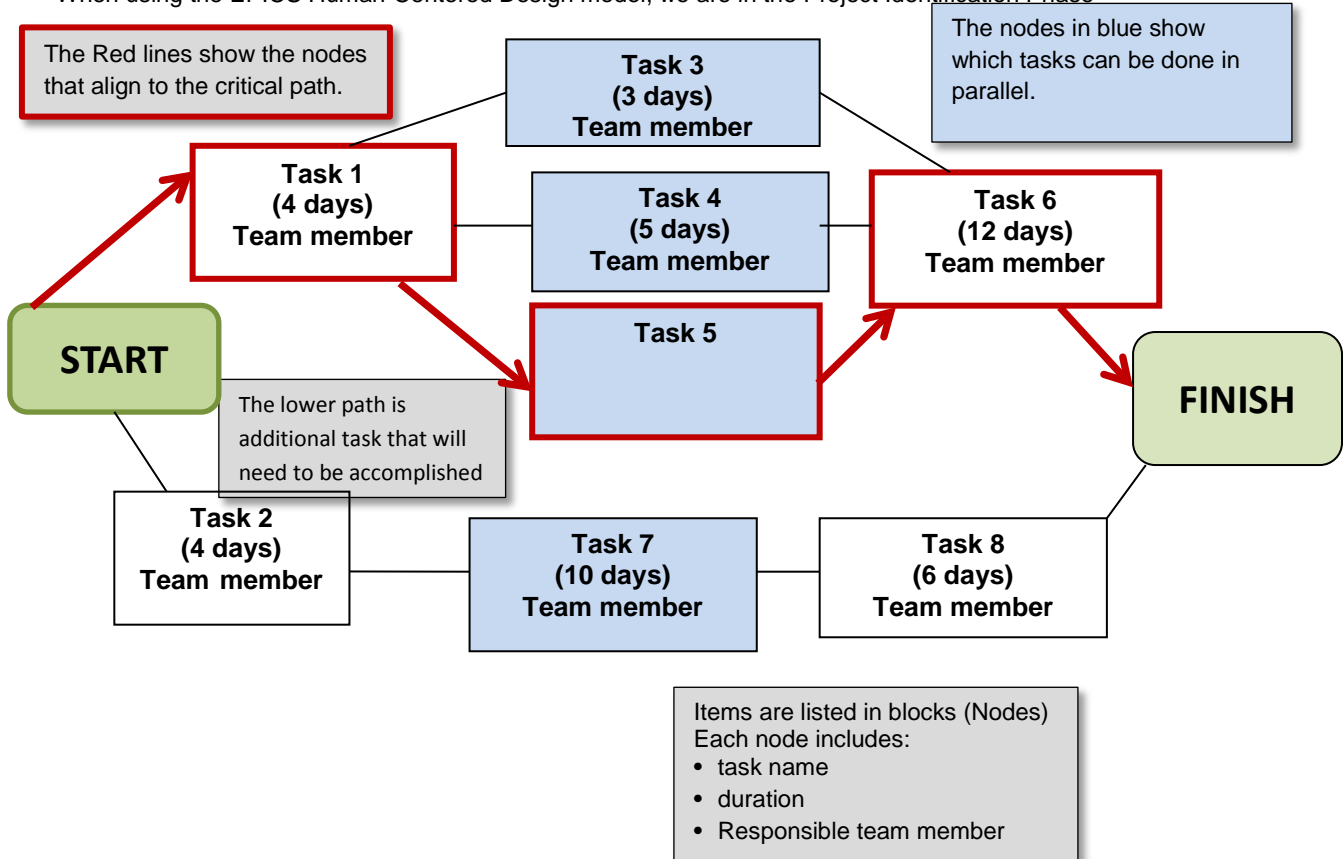
**Introduction:** In this next phase, the students will use information gathered to this point to create a Pert Chart. For further information on a PERT Chart, additional information is provided in the Teacher Tool Box 1.14- Using a PERT Chart for Project Management. This is used to help to determine when and if tasks can be done in parallel. Because each of the teams and students will have a different looking chart, in this lesson, we have only given an example of what it might look like.

Students will be working in their groups with the information they have gathered in their notebooks along with the Flowchart and the Specifications and Requirements document.

**Discussion:** What are the sections of the Project Planner that we can already identify from the information that we have already gathered?

**Note to teachers:** In this phase the students will be taking the information they have gathered from their narratives and condensing them into statements that have been used in the Project Charter. They will then take that information and translate that into their PERT Chart.

When using the EPICS Human-Centered Design model, we are in the Project Identification Phase



## Discussion in Groups:

Students will answer these questions using their student sheets and be ready to apply the knowledge gained to their own project.

- What are Nodes?
- What do nodes include?
- What are the tasks in your project that can be done parallel, or at the same time by different members of your team?
- What will be your critical path- which is the longest path and the path that must be completed for the project to be implemented?

## Creating their PERT Chart

- Students will determine the critical path (which is the task that will take the most time). They will then determine which task could be done simultaneously, then identify the responsible party on each team for each task, the duration of the task

**Note to teacher:** Remind the students that this is only a plan, but it is a good starting point. This is not written in stone and can be changed as they work through their plan with the input from their community partners and stakeholders.

## Activity 5: Wrap-Up: Reflection and Formative Assessment

### 1) Back to the Standards:

Go back to the original class document about the standards.

Ask the students:

- Did they create a more complete flow chart of their project with the task, duration, and team member responsible?
- Did this activity help the students clarify their project and have a more complete plan for implementation of the project?
- Use speaking and listening skills to be able to discuss the specifications for the projects and how they related to the budget and the implementation of the project?



### 2) Formative Assessment and student reflection: Last 5 minutes of class

- Pass out the **student debrief slips**. This will give you an idea of what they have learned in the lesson.
- Make sure that they students have their **notebooks open** with their sheets and their flow chart taped in their books.

#### Notebook check:

As the students are filling out the slips, walk around the room and check to make sure that the student have the following information in their notebook:



- ✓ Completed the PERT Chart
- ✓ Completed the student sheet with additional information recorded?
- ✓ Have the students turn in the exit slip?

### 3) Teacher Reflection: Look at the student's exit slips, the Project Specification document and the student notebook.

Have the students accomplished the objectives for the lessons?

#### Questions:

- ✓ Have the students created a PERT chart that has more information on how the project could be implemented?
- ✓ How are the students reflecting in their notebook?
- ✓ Are the students able to work effectively and efficiently in their groups?
- ✓ Are there any interventions that may need to happen to improve these skills?
- ✓ Are the students showing self-efficacy when reflecting on their own learning in the class?

## Resources:

- EPICS Design Process (2009) Purdue University.
- NGSS Lead States. (2013). Next Generation Science Standards: For States, By States. Washington, DC: The National Academies Press. For more information see <http://www.nap.edu/NGSS/>
- National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects*. Washington, DC: Authors.
- Oakes, W., (2013). Presentation for Online Teacher Training, EPICS Program, Purdue University.