

Develop a Project Plan Canvas Module

Welcome to the “Develop a Project Plan” Module!

In this module, you will learn the key steps in developing a project plan that will ensure success. While your immediate work utilizing these skills may be in the makerspace, the material in the module will help you solve problems in a wide variety of situations!

Student Learning Outcomes

Upon completion of this module, you will be able to:

- Research various equipment and materials to determine limitations and suitability for specific applications;
- Determine the most ideal tools, materials, and method(s) of creation (physical, digital, and rhetorical) for the project;
- Specify actionable and measurable project goals and requirements;
- Utilize time management and project management tools;
- Outline project milestones, including sequential action items and anticipating time for multiple prototype iterations;
- Recognize opportunities to collaborate with others who provide diverse experiences and perspectives ;
- Listen and communicate attentively to learn from and with others and
- Follow through on commitments and contribute to culture of accountability.

Items Due for this Module

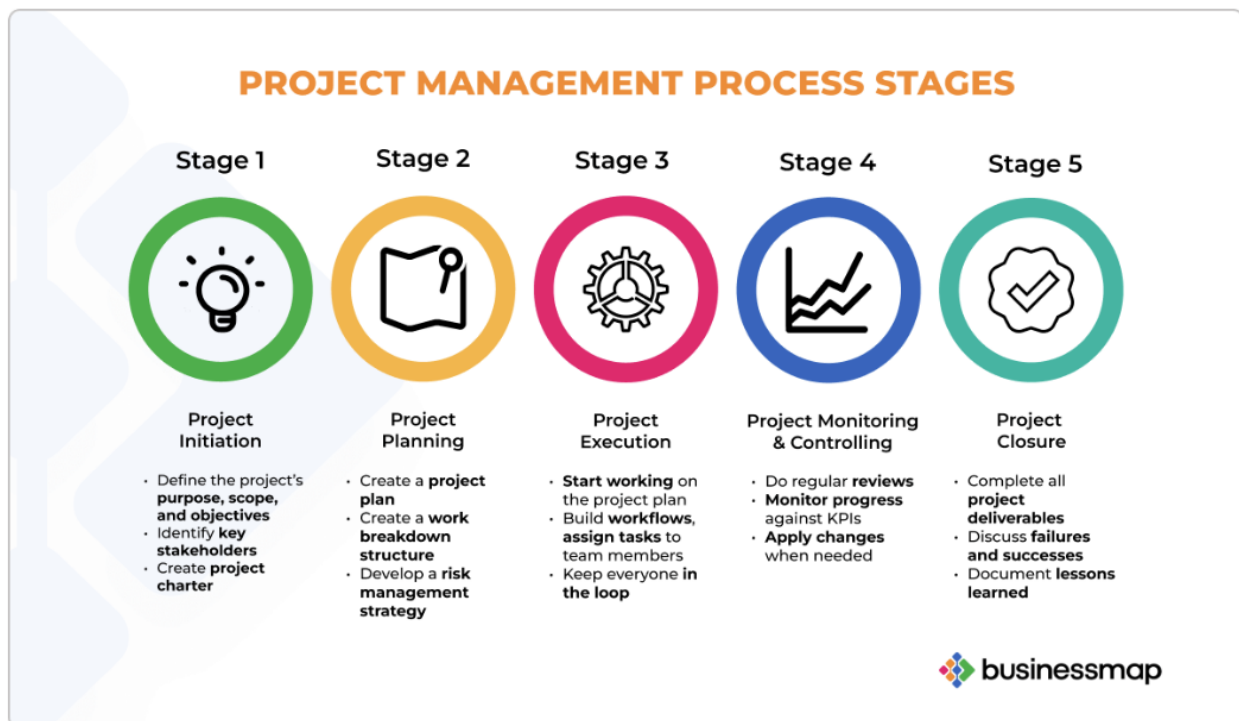
- Project specifications worksheet
- Project reflection

Project Management Process Stages

The project management process is a workflow to keep a team organized as they complete the various tasks involved with a project. This includes creating goals, timelines, establishing communications methods and more. This workflow is comprised of six stages for teams to manage each step of the process.

1. Project initiation: Defines the project's purpose, scope, objectives, and stakeholders.
2. Project planning: Creates a project plan and establishing tasks that need to be completed.
3. Project execution: Assigning people to tasks and working to complete them, with communication happening between members of the group.
4. Project monitoring: The group monitors the progress of the tasks, and ensures everyone is on schedule and making adjustments as needed.
5. Project closure: The project is complete and the group reflects on the process.

Throughout this module, you will learn more about the project management process, using the tools provided to complete each stage with your team.



Initiation Stage

The project management process begins with the initiation stage, where your group will define the scope of the project. To stay organized with this process, you will need to store your work in a shared space.

Complete as a group:

1. Create a shared cloud drive.
2. Provide access to all members of the group.
3. Create a new document.

This drive will be where you store all contents of your project, so that every member has equal access to upload and view.

Take a look at the course assignment, and read through it as a group. In the document answer the following questions:

- Who are the team members?
- When is the due date?
- What are all of the components you need to turn in?
- What are the required components of the 3 dimensional model?
- What are the boundaries of this project?
- What molecule will you transform into a 3 dimensional object?
- What resources are available to help you complete this project?
- What is the best communication method for your team?
- How often would you like to communicate?
- What are topics that you think are important to communicate to the whole group?

If there are any other questions or topics you would like to discuss as a group, this would be a great time.

Developing Project Objectives and Goals

Now that you have talked about the basic parameters of your project expectations, you will now determine the project's goals. While there are different ways to come up with project goals, this module will introduce you to the SMART goals method.

Complete as a group:

Develop two goals you would like to achieve with this project.

Consider what you want to accomplish as a group. We know you want to complete the project and make a 3 dimensional version of your model, but what are some other skills you'd like to work on together? Think about communication, productivity, managing the deadlines, efficiency in resource sharing, etc. Add these goals to your initiation phase document.

SMART goals

Specific: target a specific area for what you want to work on.

Measurable: quantify or suggest an indicator of progress.

Attainable: state what results can realistically be achieved, given available resource.

Relevant: specify why it matters.

Time-related: specify when the result(s) can be achieved.

Specific

Goals should be simplistically written and clearly define what you are going to do: what, why, and how. A specific goal will usually answer the five "W" questions:

- **What** do I want to accomplish?
- **Why** is this goal important?
- **Who** is involved?
- **Where** is it located?
- **Which** requirements and constraints are involved?

Measurable

Goals should be measurable so that you have tangible evidence that you have accomplished the goal. Usually, the entire goal statement is a measure for the project, but there are usually several short-term or smaller measurements built into the goal. A measurable goal will usually answer questions such as:

- How much?
- How many?

- How will I know when it is accomplished?

Attainable

Goals should be achievable; they should stretch you slightly so you feel challenged, but defined well enough so that you can achieve them. You must possess the appropriate knowledge, skills, and abilities needed to achieve the goal. Impossible goals demotivate them. An attainable goal will usually answer the question:

- How can the goal be accomplished?

Relevant

Goals should measure relevant outcomes, not just activities. The goals should matter. A relevant goal can answer yes to these questions:

- Does this seem worthwhile?
- Is this the right time?
- Does this match our other efforts/needs?
- Are you the right person?
- Is it applicable in current socio- economic- technical environment?

Time-Related

Goals should be linked to a time frame that creates a practical sense of urgency, or results in tension between the current reality and the vision of the goal. Without such tension, the goal is unlikely to produce a relevant outcome. A time-bound goal will usually answer the question:

- When?
- What can I do six weeks from now?
- What can I do today?

You can create SMART goals for everything from individual class projects to big future goals, like landing your dream job. Using the questions above will help you develop a plan along with all the steps and resources you'll need to accomplish it.

Goal examples

1. Each team member will streamline communication efforts by emailing the group once per week with an update on the progress on the tasks.
2. Each team member will explore one piece of makerspace equipment and share out to the rest of the group what they learned by September 20th.
3. Each team member will update the workflow task sheet as they complete the tasks by the assigned due date.

4. The group will explore four makerspace equipment options by visiting the makerspace together, and will determine which machines to use by October 1st.

Planning Stage

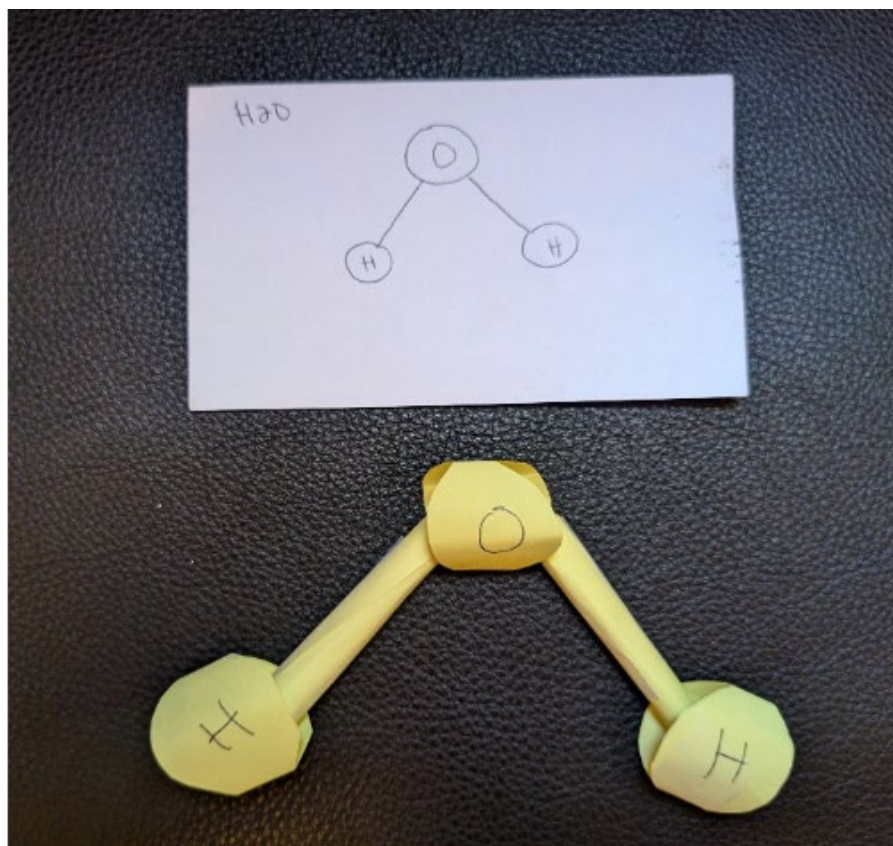
In the planning stage, you begin to set the details of your project and create a timeline for all of your tasks. This stage will include:

- Researching
- Setting project goals
- Identifying tasks that need to be completed
- Estimating time to completion for each task
- Creating a timeline and schedule

Complete as a group:

To start, let's brainstorm a few ideas for turning a molecule into a 3 dimensional object. As a group create a new document in your shared drive and consider the following points:

1. What molecule are you choosing?
2. Draw this molecule as a 2 dimensional object.
3. Draw this molecule as a 3 dimensional object, or you can use paper to create a physical representation. This may take a few tries to visualize it.



Project Specifications

A specification is a set of considerations, constraints, and requirements for a project. It should demonstrate that you understand the needs of the project that you have identified. As you begin to form your plan, it is best to consider all aspects of your project.

Complete as a group:

1. Download the Project Specifications worksheet, which can be found on the next page.
2. Edit this document and fill out the specifications table and the tool review table.

Project description

- What should the final product achieve?
- What will it functionally need to be able to do?

Time

- How much time do you have to complete the project?
- How long will it take you to design and plan the project?
- How long will it take you to fabricate the project?

Dimensions

- What are the dimensions of the entire product?
- What are the dimensions of the varying components?
- What are the dimensions of the raw materials?

Components

- How many components will it have?
- What is the purpose of each component?
- How does each component contribute to the final product?
- How do they need to fit together?

Tools and techniques

- What tools and techniques are available?
- What tools and techniques can fabricate the required product specifications?
- What tools and techniques will I implement?
- Will I need to learn new tools or techniques?

- Will I blend certain tools or techniques?

Materials

- What materials do I have access to?
- What materials will be used?
- What properties do my materials need to have?

Aesthetic

- What is my desired effect? (color, texture, shape, finish, pattern, etc.)
- Will my desired effect be achievable with available tools and materials?

Constraints

- What limitations do you face? Think about time, cost, materials availability, etc.

Tool review

As you begin your research on the various tools available to you, you will fill out the tool review table. This table provides spots for you to consider the advantages and disadvantages for each tool. Please reflect on the considerations you wrote from the project specifications exercise. Think about how this tool will contribute to your project, and ways that it may not be able to.

Consider the following questions as you review makerspace tools. Think about this in regards to your molecule, and how you want to turn this into a 3 dimensional object.

- What is the tool name?
- What are the advantages?
- What are the disadvantages?
- Why am I considering this tool?
- What are the potential design compromises I may need to make? Will I need to adapt this tool to fit my needs?

Project Specifications Assignment

Please submit the Project Specifications worksheet that you completed as a group.

Creating a plan

We want to capture all the work that needs to be done without getting too granular at this point. We don't want our tasks to include every small detail of the work, but they also shouldn't be so big and broad that they overlap with each other.

Complete as a group:

Create a document for your project plan and consider the following:

1. Create a list of all of the tasks that need to be done in order to complete this project.
2. Estimate a time frame for each task.
3. Re-order these tasks and place onto a simple timeline. Think about what needs to be done first, or if their are pre-requisite tasks.

As you are creating your tasks here are some tips:

- Schedule in more time than you think you will need to complete a task.
- Schedule time to complete the makerspace equipment trainings.
- Schedule time to do some research on the makerspace equipment and materials you'd like to use. It may take time for you to explore a few options before you decide on one.
- Consider the materials you will need and how you plan to get them.
- It may help you to start with the final project deadline for the course, and go backwards. Adjust the deadlines as needed to fit with this final deadline.

Remember this is a living document, and you can add to it as you do your research and adapt your plan.

Execution Stage

The project team will begin developing project deliverables and working to meet the project's goals and objectives as specified in the project plan. In this stage, your team will build your workflow and assign tasks to teammates. You will begin to work toward completing the tasks you created.

During the project execution, teammates need to:

- Manage resources
- Build workflows
- Monitor progress
- Address and resolve any issues.
- Maintain good communication as a team.

Balancing multiple responsibilities simultaneously can become overwhelming and hinder productivity. To keep up with everything going on, your team can rely on project management tools, like Gantt charts, to help them track work and collaborate seamlessly with everyone.

Project management tools can help you do the following:

- Planning and Scheduling
 - Identify and track the project milestones.
 - Identify and track the actionable steps to lead to achieving those milestones.
 - Integrate timelines and deadlines that allow for adequate brainstorming, prototyping, and revising.
 - Schedule time to work in the makerspace, ensuring you reserve times with the machines and maker wranglers.
- Documentation
 - Facilitate documentation of the project, including versioning and storage of all files.
- Collaboration and Communication
 - Provide opportunities for team members to work together via dashboards, task assigning, comments, and more. (We all know email isn't always the best for these types of issues!)

Project Management Tools

After creating your goals, tasks, and timeline you'll want to choose the best project management tools or methods for your project.

Gantt chart

A Gantt chart is a visual view of a project plan over time. They are bar charts that usually depict the following:

- Task list
- Timeline
- Dateline
- Milestones
- Dependencies
- Progress
- Resource assigned

Tracking time

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
			2/10/20	2/17/20	2/24/20	3/2/20	3/9/20	3/16/20	3/23/20	3/30/20	4/6/20	4/13/20	4/20/20	4/27/20	5/4/20	5/11/20	5/18/20	5/25/20	6/1/20	6/8/20	6/15/20	6/22/20	6/29/20
1	Tasks to be completed:	Task assigned to:																					
2			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3	Competitor Research	Brianna	5	5																			
4	Choose Materials	Jordan & Brianna			15	15																	
5	Develop a Business Plan	Brianna					2	2	2	2													
6	Finance Laser Cutter	Jordan									3	1	1										
7	Purchase Laser Cutter	Jordan												4	0	0							
8	Learn Laser Cutter & Software	Jordan & Brianna															8	8	8	8			
9	Aquire Bulk Materials	Brianna																			3	0	0
10																							
11	Pick Business Name	Brianna & Jordan					3	2															
12	Get Business License	Brianna									4	0	0										
13	Develop Website	Jordan																			0	8	2
14	Create Social Media	Brianna																			0	0	4
15																							
16																							
17																							
18																							
19	Total Hours Per Week		5	5	15	15	5	4	2	2	7	1	1	4	0	0	8	8	8	8	3	8	6
20																							

Here we have an example Gantt chart that show all our tasks, who has been assigned to complete them, how long we have allotted for each task, and our critical path at the time in red and our floating tasks below in green. We can see that some tasks can be overlapped and done at the same time (create social media and create website, for example).

We've also included the number of hours we think each person will spend on each task. We can then total them up to see how many hours the team will be spending on this project each week. We can also see how many total hours we are allotting for each task.

Project management tools

How different project management tools accomplish these tasks will vary and you may need different tools depending on the type of project you're working on. Below are a few examples of web-based project management software. Many of them have free versions that are also great to manage your own personal work and schedule!

- [Trello](#)
- [Basecamp](#)
- [Asana](#)
- [Wrike](#)
- [Monday](#)

While there are a number of commercial project management tools, you can create a great project management system with software and systems you already have access to, including email, online calendars, shared file storage websites, and more.

Complete as a group:

1. Determine which project management tool you would like to use to monitor your project.
2. Create a project management plan with the chosen tool, and lists the tasks that need to be completed.
3. Assign a timeline for each task.
4. Assign a person(s) for each task.
5. Start to complete your tasks.

Monitoring Stage

As time moves on, your team can monitor if you're still on track by highlighting the column that matches which week of the project you're currently in. You can also highlight or fill in the tasks you've completed. The image below is an example of a Gantt chart created in Excel. Your team will begin to cross off completed items within your chosen project management tool.

		2/10/20	2/17/20	2/24/20	3/2/20	3/9/20	3/16/20	3/23/20	3/30/20	4/6/20	4/13/20	4/20/20	4/27/20	5/4/20	5/11/20	5/18/20	5/25/20	6/1/20	6/8/20	6/15/20	6/22/20	6/29/20
Tasks to be completed:	Task assigned to:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Competitor Research	Brianna	X	X																			
Choose Materials	Jordan & Brianna			X	X																	
Develop a Business Plan	Brianna				X	X	X	X	2													
Finance Laser Cutter	Jordan									3	1	1										
Purchase Laser Cutter	Jordan												4	0	0							
Learn Laser Cutter & Software	Jordan & Brianna															8	8	8	8			
Aquire Bulk Materials	Brianna																			3	0	0
Pick Business Name	Brianna & Jordan				X	X																
Get Business License	Brianna									4	0	0										
Develop Website	Jordan																			0	8	2
Create Social Media	Brianna																			0	0	4
Total Hours Per Week		0	0	0	0	0	0	0	2	7	1	1	4	0	0	8	8	8	8	3	8	6

Accountability

As you begin to complete your tasks and cross them off the list, it is best to communicate your progress with the group. In your first meeting, you discussed how you would like to communicate as a group. Adhere to this method, and if it is not working meet as a team to discuss your communication barriers and create a plan to move forward.

Periodically throughout the semester, discuss as a group:

- Are you on schedule?
- Who will monitor this and keep everyone accountable?
- Are there roadblocks?
- How do you get past them?
- Do you need to readjust the deadlines?
- Are you communicating with you team about these roadblocks and working together to create new deadlines?

Closure Stage

Your team has created a 3 dimensional version of a molecule, and has hopefully achieved all of the goals you discussed at the beginning of this project. The closure stage includes reflecting back on the project and identifying any lessons learned and final results.

Complete as a individual:

Create a new document and reflect on the following questions:

- What were your goals?
- Did you complete these goals?
- If a goal was not completed, what were your barriers?
- As your project progressed, what elements went well?
- As your project progressed, what elements did not go well?
- How did you overcome these barriers or difficulties?
- Think about a time when a teammate had a different perspective or opinion. How did you address those perspectives and move forward?
- What did you learn from this experience?
- You learned a lot of skills from this assignment. How can you apply these skills after you graduate?

Congratulations, you have completed this project! It is time to celebrate!

Reflection Assignment

Please submit your individual reflection.

Here are the questions you should address:

- What were your goals?
- Did you complete these goals?
- If a goal was not completed, what were your barriers?
- As your project progressed, what elements went well?
- As your project progressed, what elements did not go well?
- How did you overcome these barriers or difficulties?
- Think about a time when a teammate had a different perspective or opinion. How did you address those perspectives and move forward?
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