

## 1.16 Teacher Tool Box- Proof of Concept



The **Proof of Concept** is a way of evaluating the idea of how the prototype will meet the needs of the underserved stakeholder. This prototype may be functional; however in most cases it just represents the concept to determine dimensions and possible functionality. The students will be communicating the concept of the prototype through graphic illustrations, photographs, a written description and a 3D representation. This type of testing is used to evaluate a new product idea.

**Goals:** Here are the basic goals of the Proof of Concept.

- 1) Have a written document that explains the Prototype and how it will meet the needs of the stakeholder.
- 2) Communicate the defined goals of the project or product that have been defined in the specifications for the project to the stakeholders and project partners. The expectations for the product must be clearly defined and you must not promise more than what you can realistically deliver.
- 3) Determine the viability and usefulness of the prototype and see it in action.
- 4) Test the usability and viability of the prototype with measurable criteria.

**Basic Steps to Create the Proof of Concept-** Here are some basic steps that will help to develop a quality Proof of Concept.

**1) Define basic requirements-** Define the parameters of the project. This will include the following pieces:

- Description of the Product including the dimensions, a photograph or diagram, Specifications and important characteristics.
- Describe the purpose of the product including the goals and objectives.
- Define the Success Criteria
- List the materials used, the limitations of said materials and their tolerances.
- Goals of the proof of concept prototype- What are you hoping to determine through the creation of the prototype and the testing?
- Benefits of the Prototype- What are the benefits and possible risks of testing the prototype if any?

**2) Prioritize the specifications-** Determine what specifications are highest priorities.

**3) Define your strategy-** How are you going to test your prototype?

- Who will be testing the prototype?
- How long will the testing take?
- What are the features of the prototype that will be tested and who is responsible? (This will relate back to your specifications. These may include but may not be limited to: safety, durability, power, weight, accessibility, physical dimensions.)
- Develop a Testing Procedure- What are the steps that you will take to measure the one specification that you had identified?
- What are the measureable criteria that you will use in this testing protocol?

**4) Execute the test and measure the performance of the prototype-** Keep it simple a 1-5 scale then discuss on the team how to weigh those values based on the specifications.

**5) Summary:**

- Summarize the results from the testing. Relate these findings back to the goals and objectives for the product.
- How well did it meet this specific requirement?

**Here is an example of a Testing Procedure for an EPICS Project.**

SOAPBOX DERBY CAR EXAMPLE

(insert picture of derby car and two teammates in car)

(insert picture of test hill)

(insert picture of brakes)

Output: Distance to complete stop must not exceed 300 ft (race track has big trees at the bottom of the hill)

Output: Brakes need to last a whole day of racing (brake pads get worse when they get hot)

Input: Maximum hill height could be 50 ft

Input: Derby car designed to carry two people

Input	Input	Test Procedure	Output	Output
Weight	Hill Height	1. start by driver letting off of brake	Brake Distance ( <u>ft</u> )	Brake Temperature ( <u>°C</u> )
150 <u>lbs</u> (1 person)	10 <u>ft</u>	2. <u>apply</u> brakes at bottom of hill		
150 <u>lbs</u> (1 person)	20 <u>ft</u>	(slam on the brakes!)		
150 <u>lbs</u> (1 person)	30 <u>ft</u>	3. without moving car, measure distance from front wheel		
150 <u>lbs</u> (1 person)	40 <u>ft</u>	4. at the same time, measure brake temperature with Infrared Temperature gun		
150 <u>lbs</u> (1 person)	50 <u>ft</u>	5. Push car back to top of hill		
300 <u>lbs</u> (2 persons)	10 <u>ft</u>			
300 <u>lbs</u> (2 persons)	20 <u>ft</u>			
300 <u>lbs</u> (2 persons)	30 <u>ft</u>			
300 <u>lbs</u> (2 persons)	40 <u>ft</u>			
300 <u>lbs</u> (2 persons)	50 <u>ft</u>			

**Resources:**

Cumming, A., (2014) EPICS Test Plan Template, Purdue University.

United States Government National Archives- <http://www.archives.gov/records-mgmt/policy/pilot-guidance.html>

EPICS Documents