Peer Assessor's Name: _____ **(Suppl. 8 to *The Scots of Scarborough,* V1#1)**

Bridge Technology in Terms of the Thirteen Fundamental Concepts of Technology

A Product Requirements Development Strategy

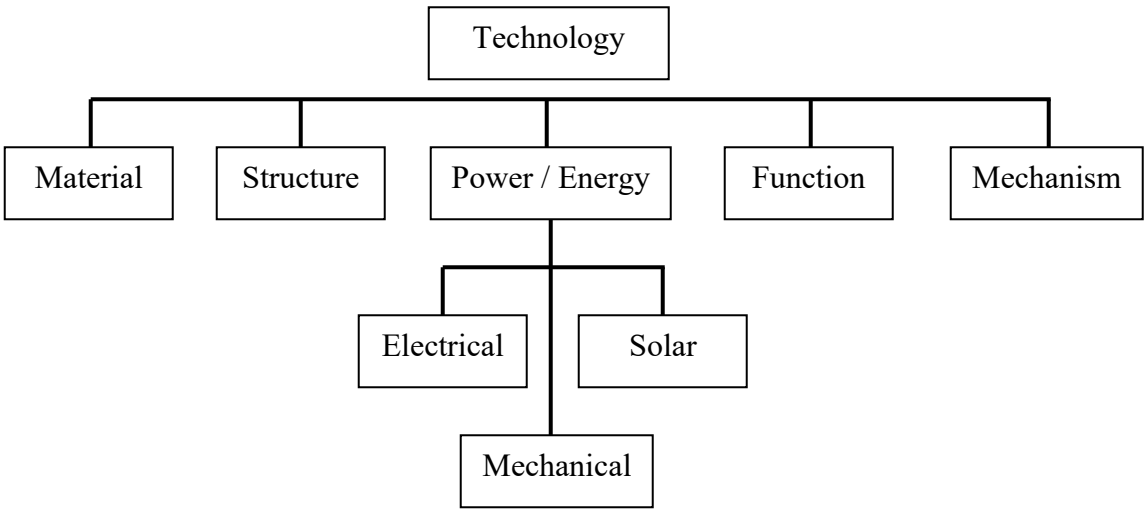
Research begins with what is already in your brain – ie *Knowledge*

COMPLETE THE EXERCISES AND PUT THIS FILE IN IN YOUR PORTFOLIO FOLDER

TABLE OF CONTENTS

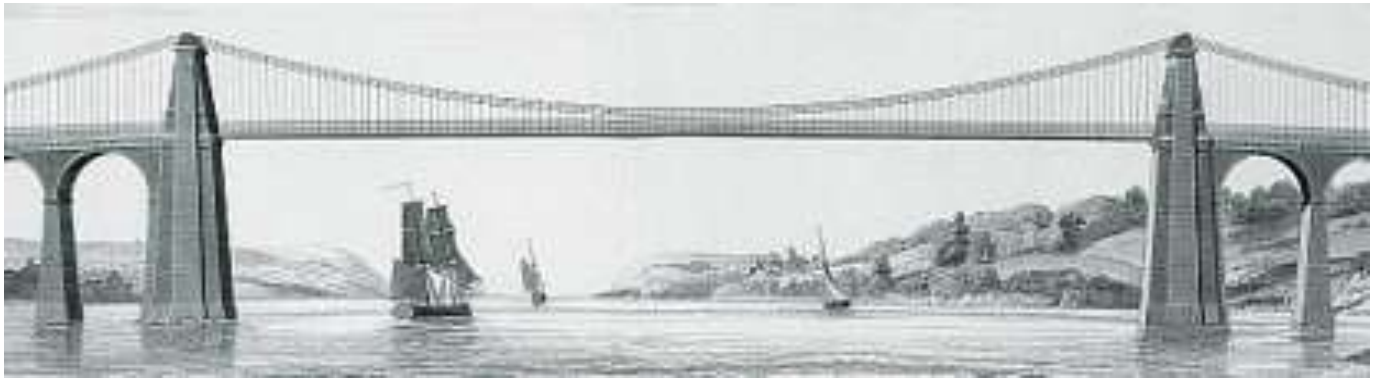
1 Expectations: The Student will…

#	Expectation: I will…	Self-Assessment: Did I Achieve What I Needed to Achieve?
1	Describe the thirteen fundamental concepts of technological education in the context of a model of a suspension bridge	
2	Use existing knowledge as the starting point for research, investigation and inquiry.	
3	Make some connections among, and find inter-relationships between, the 13 fundamental concepts of technology. Derive one "New" concept from two or more of the fundamental concepts.	
4	Model, sort and interpret information to make learning easier and as a starting product for a Product Requirements document.	



2 This Technology Evolution Lesson is Significant Because

- Rivers were a significant impediment to local, regional and national travel. Rivers and other natural channels along the terrain held back economic progress.
- While good roads were an important part of the economic infrastructure, without convenient means to cross a deep river, they were of little help in growing the regional economy.
- A road was only as good as its bridges.
- Fords were only useful at shallow, narrow and slowly moving waters.
- Ferries were expensive to operate and inconvenient to use.
- A solid cross-section beam bridge is an inefficient use of a material
- A truss bridge has many joints that must be maintained
- An arch bridge is expensive to build and mortar must be maintained



Thomas Telford's Menai Bridge, Wales
(http://www.engineeringhalloffame.org/profile-telford.html)
Arguably the world's first modern suspension bridge

3 Thirteen Fundamental Concepts of Technology… In a Certain Context

1) Look at the image of the Menai Bridge above – the long central span in particular. Do not go on the internet. Do not go to the library. Do not ask someone else. Using only current knowledge in your brain and your thinking skills:
   a) In column 3 of the table below, discuss / interpret the Menai (or any other) suspension bridge in terms of the 13 fundamental concepts of Technological Education.
   b) For instance: ***In the Materials row – "The tall towers must be made of a material that is good at resisting compression stresses because the load on the bridge is pushing downward on the towers"***
   c) Your goal with what you write in column 3 of each row will guide you toward:
      i) A better understanding of a suspension bridge
      ii) A "first pass" at a Product Requirements document for the bridge that you will design
   d) Get a colleague to Peer-Assess your work.

3.1 State Your Design Goal and Get Started on "Requirements"

- I will design a suspension bridge – a model of the central span of the Menai Bridge, properly anchored at both ends.
- In column 3, I will basically state a first pass at:
  - What my bridge must "look like" – construction requirements
  - What my bridge must "behave like" – performance requirements

1 **Keyword / Concept**	**2** **An Initial Definition** ***(Based on the Ontario Tech Educ Curriculum Document)***	**3** **Student Interpretation / Application / Additional Context** **Some "Things to Think About" – Suspension Bridges in the Larger Context of a Technological System**
Aesthetics	The aspects of a product, process, or system that make it pleasing to the human senses.	
Controls	The means by which a mechanism, device, process or a sub-system is activated and / or regulated.	
Ergonomics	The design of a product, process, system or service in a way that takes the user's well-being with respect to its use or delivery into account – that is, in a way that minimizes discomfort, risk of injury, and expenditure of energy and that maximizes convenience. "User-Friendliness" is one simple way of viewing Ergonomics. We can liken Ergonomics to "Human Factors Engineering".	
Fabrication	The act or process of forming and assembling components and / or materials and resources to create a product, structure, system or service. We can liken Fabrication to "building" and "creating". Fabrication is a process that we can follow to yield a result.	
Function	The use for which a product, process, or system is developed. Fitness for the intended purpose is very important	
Innovation	Original and creative thinking resulting in the effective design of a product or service. Innovation is a subset of "Problem-Solving", relying greatly on personal thinking skills and team collaboration.	
Material	Any substance, resource or item used in the creation of a product or system or in the delivery of a service. Note that "information" is a resource.	**Read this teacher sample –** ***"The tall towers must be made of a material that is good at resisting compression stresses because the load on the bridge is pushing downward on the towers"***

1 **Keyword / Concept**	2 **An Initial Definition** ***(Based on the Ontario Tech Educ Curriculum Document)***	3 **Student Interpretation / Application / Additional Context** **Some "Things to Think About" – Suspension Bridges in the Larger Context of a Technological System**
		Then delete the teacher sample and write your own.
Mechanism	An arrangement of connected parts that allows a component, product or system to work or function.	
Power and energy	The resource that enables a mechanism to perform work. In its most general sense, energy is the capacity to "have an effect". Power is how fast the work is getting done. Power is Energy divided by Time.	
Safety	The care and consideration required to ensure that the product, process, system or service will not cause harm. All workers must perform their work according to best practices which preserve health and minimize danger to life and property.	
Structure	The essential physical or conceptual parts of a product, process, system or service, including the way in which the parts are constructed or organized	
Sustainability: Environmental and Socio-Economic	The creation of products or services and use of resources in a way that allows present needs to be met without compromising the ability of future generations to meet their needs. An important related concept is that of environmental stewardship – the acceptance of responsibility for the sustainable use and treatment of land and other natural resources. If an otherwise "sustainable" activity has an unsafe by-product – can we still consider it to be sustainable?	
Systems	The combinations of interrelated parts (e.g. structures and / or mechanisms) that make up a whole and that may be connected with other systems.	

When finished entering your responses in column 3, get some peer assessment and then do the Suspension Bridge moodle quiz at http://thinkproblemsolving.org.

4 Safety Reminder

A bridge is one of the great classic engineering structures. If a bridge falls down, people could die. To design a bridge, you must have a profound understanding of the likely loads on the bridge and of the capacity of your component materials to withstand those loads.

5 Reflection: Knowledge / Understanding That I Still Need For This Module

Complete the Self-Assessment column of the Expectations table above. Provide further details below as necessary.

Give each issue a number for future reference:

1) What I did well
   a)
2) What I did not so well
   a)
3) What I will do better in a future similar situation
   a)

6 Peer Assessment

In the feedback, the Peer Assessor must "make the student think" – not give the student the answer! Be sure to include helpful comments justifying the "mark" that you are giving.

Assessor's Name and Additional Notes: