

Problem Solving and Design Skills

Design / Build a Marketable Picture Frame Using Scrap Wood Flooring

Review of Tech Design Fundamentals

Info in red font is for the benefit of the teacher (ideas for differentiated learning etc). Delete text in red font from the copies that are distributed to students.

Version History:

V #	Date	Author	Short Listing / Description of Changes
1	Apr. 30/12	D.B. McCowan	-Initial Version -- borrowed many questions from B. McCowan`s tech studies Moodle quiz system -uploaded to OCTE Safety Portal
2			

1 Review – You Should Already Be Familiar With...

By this time in the course you should have at least partially addressed most of the ‘A’ Expectations in the course Curriculum – “Technological Design Fundamentals”. As you begin to apply your Tech Design knowledge in hands-on application projects such as this one, the teacher will review these Tech Design Fundamentals with the class. For each review question below, make sure that you are thinking about your current project – the marketable picture frame in this case. When answering these questions you are encouraged to do as much research as you wish – books, internet, magazines. But don` t let a friend give you the answer – this denies you a valuable critical thinking opportunity.

The review questions below generally fall into one (or perhaps more than one) of the following tech education categories:

- TE Technological Education
- DPR Design Process
- FCT Fundamental Concepts of Technology
- PL Planning
- COM Communicating
- CC Career Connections

In the table below, use the “Categ” column to group the questions according to the above categories. Use the Table / Sort function of the word processing application to sort the rows by Category. This sorting is one aspect of “information processing” – to “interpret” a set of information in a special way is a thinking skill that you should practice.

DL-L: These students may prefer the teacher to categorize and sort the questions in the table ahead of time.

Before distribution to students, delete the answers and discussion points.

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These review questions could be given to students in an on-line learning management system such as Moodle.

#	Categ	Question	Answer / Discussion
1		A picture frame need not be aesthetically pleasing because people are only looking at the picture inside the frame. (T/F)	False Careless workmanship, for example, on the frame will suggest an 'I don't care' attitude, which will reflect poorly on the picture.
2		A Portfolio is a collection of the evidence of your achievement and personal improvement. (T/F)	True A good portfolio will help get you a promotion or a better job with a better company.
3		All project documentation and drawings must include information pertaining to the: a-- project title b-- author's name c-- date d-- version number e-- all of the above	e On a drawing, this information belongs in the title block. If your customer has a concern about the product design, he or she must be able to contact you, the designer.
4		If a product falls apart under reasonable conditions of use, then it has not been _____ very well.	fabricated built constructed Design flaws could have also contributed to the failure.
5		If the floor boards that you are re-using in your picture frame project have old nails in them, you must carefully pull them completely out before using tools to cut or plane the boards. (T/F)	True If you "hit" a large nail, spike or bolt you may perhaps even damage bearings in a machine. This will be extremely costly. Check for nails etc before touching the board with any wood-cutting tool – hand or power.
6		If your wooden picture frame is not provided with parts to securely hold a photograph, the frame is not performing its intended function. (T/F)	True The wooden frame is just one part of a picture-hanging system.
7		In technology courses you will solve problems by connecting and applying certain relevant concepts of science using none of the tools of mathematics. (T/F)	False Math is not simply a course that you must take in school. Mathematics is a collection of tools that are available to you for solving problems and realizing opportunities.
8		In the Ontario Curriculum, the Overall Expectations are what must be learned – the “what to learn”. (T/F)	True A student's grade or mark is based on the student's achievement of the Overall Expectations. The Specific Expectations (ie non-overall) can be viewed as the “how to learn” or “what do I do to get there”.

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9		Peer Assessment is a kind of _____ Management	Quality Improving the quality of your work a bit at a time will encourage you to raise your own expectations of yourself. This is part of managing your learning.
10		Thinking is not only an Achievement Category, but also a vitally important skill. Which of the following is the least valuable kind of thinking? A Recalling or memorization of facts B Analyzing C Interpreting D Evaluating E Creative thinking such as synthesizing a design	A Seven core and fundamentally important thinking skills in increasing order of complexity are: Recall, Translate, Interpret, Apply, Analyze, Synthesize, Evaluate.
11		Using fire to heat your home, moving yourself from point a to point b using a wheel, lifting some bricks using a lever and fastening parts together using a screw are all examples of important technologies today. (T/F)	True Two of the most fundamentally important machines in our modern technological world are the inclined plane and the lever.
12		What is the significance of using scrap wood flooring to build a picture frame? A Re-use perfectly good material, preventing it from going to a landfill site B The wood flooring has a story to tell – about the people who walked on it; about the achievements that were realized there. C Uniqueness, especially if flooring features such as tongue / groove are retained D Learn about a simple yet key component of a larger system that we call a “house” E All of the possible responses	E Of course, this is a blend of the fundamental concepts, Material and Sustainability.
13		Which Essential Skill is the best match to: “Creating a step-by-step fabrication plan so that someone can build a product” a Document Use b Lifelong Learning c Computer Use d Oral Communication e Working With Others	a Sure, a fabrication plan could be all verbal, but you are taking a chance on the person making mistakes.
14		Which Essential Skill is the best match to: “Trouble-shooting a problem such as why your hand saw is getting stuck.” a Writing b Working with others c Lifelong learning d Thinking Skills	d Before you ask someone for help, make a solid effort to think it through and solve the problem yourself.
15		Which Essential Skill is the best match to: “Using the pythagorean theorem to make a 90 ° cut across a board.” a Computer use b Document use c Numeracy d Reading e Thinking skills	c If you have forgotten the pythagorean theorem, you may have to search the internet for the definition and then read it carefully to understand it. But the key here is to use a simple set of numbers and measure out 3 distances.
16		Which four fundamental concepts of technology are the most critical in a project to design / build a picture frame using scrap	C

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#	Categ	Question	Answer / Discussion
		wood flooring? A System, Aesthetics, Control, Function B Ergonomics, Innovation, Energy, Mechanism C Sustainability, Fabrication, Structure, Safety	All 13 of the fundamental concepts are typically significant in a tech project. The picture frame is a very simple system with no moving parts. Jot down your justifications as to why Safety, Sustainability, Fabrication and Structure are the critical four.
17		Which Work Habit is the best match to: “You will be so proud of your high quality product that you will ask the principal to put it on display in the front foyer”? a Balance b Teamwork c Working Safely d Self-Advocacy e Entrepreneurship	d
18		You must evaluate version 1 of your product against your Requirements document in order to see if it needs to be improved. (T/F)	True Your Requirements document was your initial list of “here’s what my product must look like and how it must perform”.
19		Your _____ is your most important tool for learning and for productive work in industry.	Brain Your brain controls your hands, arms and legs by sending electrical signals through your nervous system. Your brain enables you to use hand and power tools. In your brain you process information as you solve a problem.

2 Self and Peer Assessment

NOTE: In the feedback, the Peer Assessor must “make the student think” – not give the student the answer! Be sure to include comments justifying the assessment value that you are giving. Peer Assessor must put his / her comments in red font.

Assessor’s Name and Additional Notes: