TECHNOLOGY EDUCATION CURRICULUM

Mansfield Middle School

Bob Burrington

Unit	Learning Objectives	Activities	Assessment Strategies	Resources
GRADE 5 - Safety	Students will be able to: • understand the importance of safety • understand and use safety precautions with power equipment • Demonstrate the proper usage of power woodworking equipment	1. Wear safety glasses 2. After cutting wood, file rough edges before sanding. 3. Make sure safety glasses are on and the dust collector is on before turning on sanding machines 4. *Remember the 2" rule*. (Nothing smaller to be cut or sanded on the stationary power equipment. The abrasive paper can cut skin very quickly.) 5. Always sand stock on the left side of the rotational disc to prevent kickbacks. This is the downward motion side of the sanding surface 6. Do not operate if the abrasive paper is loose or torn.	Assessments will be done through written Safety Test with 100% required and visual inspection	Internet sources. *Woodworking Teachers.net* *woodshopteachers.org* *howstuffworks.com*

Unit	Learning Objectives	Activities	Assessment Strategies	Resources
GRADE 5- Skill #1 Hammers	The students will be able to: • Know the different parts of a hammer • Demonstrate the correct way to grip the handle • Perform the correct swing of driving a nail • describe the difference between wire brads and wire nails	1. Correct way to hold a hammer and proper swing for a nail. 2. To set a nail flush with the board without creating a big dent. 3. Practice driving different nails without bending them. 4. Practice joining two boards together. 5. Have students measure out a 3 x 9in block on the graph paper. 6. Have students print their first name to fit within the block. 7. Transfer name onto block of wood using a piece of carbon paper. 8. Students drive 5/8in wire nails into the letters to create a nameplate	Assessments will be done through project rubrics, class participation and visual inspection of students working in a wood shop atmosphere.	“WOOD” magazine by Paul Meisel.

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GRADE 5- Skill #2 Sanding	The students will be able to: • explain the importance of different grit sandpaper • Demonstrate how to sand with the grain • Implement new sanding skills into their project	1. Begin with 60-80 grit to remove machine marks. Move to 120-220 to eliminate scratches and smooth the wood. 2. Sand with the grain of the wood rather than across to avoid making scratches. 3. Wipe away dust rather than blow it off. (wiping it off allows dust to drop, blowing it suspends it in the air & could get in your eyes) 4. Clamp wood board in vise (or use sanding mat where applicable). 5. Wrap sandpaper in sanding block. Starting with 60-80 grit and working up. (it should only take 15 to 20 strokes to remove saw marks. Change grits and lesser strokes) 6. Sand while holding the sanding block flat on the work piece. 7. Sand face grain, edge grain, and end grain	Assessments will be done through project rubrics, class participation and visual inspection of students working in a wood shop atmosphere.	“WOOD” magazine by Paul Meisel.

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GRADE 5- Skill #3 Drill Press	The students will be able to: • Select to correct bit for a desired hole • Set and use a vertical depth stop • Correctly lower and raise the quill feed handle when drilling	1. Review safety rules with a drill press. Hand out. 2. Teacher to demonstrates the different parts of a drill press 3. Adhere Jump a peg pattern to their work piece (with glue stick). 4. Punch starter holes where marked on pattern with awl. 5. Students start with scrap wood clamped securely for drilling. *Remember:* use scrap wood as a blocker board. Do not drill into table. 6. Students set up work piece in clamp on drill press. 7. Install proper drill bit and set depth stop 8. Align bit with hole marked by awl.	Project Rubric- neatness straight lines. Proper depths. Clean holes. Class participation and visual inspection of students working in a wood shop atmosphere. Drill Press Safety Quiz	"WOOD" magazine by Paul Meisel.

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GRADE 5- Skill #4 Miterbox Box & Saw	The students will be able to: • Correctly hold boards in a miterbox • Explain why they should cut on the waste side of the line • Hold the saw parallel to the work piece's top face while sawing	1. Sawing a 90 and 45 degree cut with the miterbox. 2. How to start a cut (one stroke backwards) 3. In groups of two to a miterbox, students make will saw several 45 & 90 degree practice cuts. 4. Students begin making next project; Lollipop Tree. Consists of making nine successively longer pieces cut from ¾ x ¾ stock. (Students will also drill holes through each branch for center dowel and sand pieces to be painted later) 5. Students use a rule and pencil to mark each cut and saw on the waste side of the mark.	Assessments will be done through project rubrics, class participation and visual inspection of students working in a wood shop atmosphere.	"WOOD" magazine by Paul Meisel.

Unit	Learning Objectives	Activities	Assessment Strategies	Resources
Grade 6	Students will read orthographic drawings and use design and layout tools for writing the plans for projects they will then construct from wood. Students will discover different types of material for building, such as plastic. Students will use various techniques for forming plastic acrylic sheets.	1. Students will read and draw 3-view orthographic drawings from solid objects. 2. Students will use design and layout tools, such as try squares, compasses, and steel rules to create a hinging sign for home use. 3. Students will explore the different types of plastics and form a product (key chain for example) using various techniques.	Assessments will be done through classroom worksheets, project rubrics, class participation, and visual inspection of students working in the computer lab and wood shop.	"Technology: Shaping our World", by Malcolm Welch, John

Unit GRADE 6	Learning Objectives	Activities	Assessment Strategies	Resources
Bookends	Students will be able to: • Use layout tool correctly • Read/write a layout plan • Understand the different methods used in construction • Build background on diverse technologies	1. Teacher to review, explain and show examples of the Bookend project that are going to design and construct. They will need to use the tools they were introduced to for the Candy Dispenser project. Various tools are needed to lay out a project. These include the tri square, tape/rule, compass, marking gauge, calipers. Hand out sheets on Measuring and Layout tools. 2. Hand out plans for Bookends 3. Teacher to model use of layout tools on pieces of wood needed to construct a bookend. 4. Students complete the thumbnail and detail drawings in the packet to design a set of bookends. 5. Next, students use measuring & layout tools to help with setup and placement of parts to be cut on their project. 6. Using only hand tools, students will cut their pieces they have laid out after using the proper layout tools. 7. Teacher is to inspect pieces after cutting for approval to	• Observations of setup and proper use of layout tools. • Finished project • Grading Rubric	

		move onto the next step. 8. Students will use the stationary sander to sand (to the line), the proper size of their bookend. 9. Some students will learn about the different types of customizations available through the different technologies, i.e.- vinyl graphics, compucarve 10. By reading their plan that they designed, students will be able to use different tools and techniques for each individual project. They include the Compucarve, vinyl graphics, wood carving, wood burning etc. They will follow the proper steps for each machine or process. 11. Students will attach their design to both bookends to complete a set of two bookends. 12. Apply finish		

Unit GRADE 6	Learning Objectives	Activities	Assessment Strategies	Resources
Candy Dispenser-Layout Tools and proper use	Students will be able to: • Use layout tool correctly • Read a drawing/plan • Understand the different methods used in construction • Build background on diverse technologies	1. Teacher to explain and demonstrate the various tool needed to lay out a project. These include the tri square, tape/rule, compass, marking gauge, calipers. Hand out sheets on Measuring and Layout tools. 2. Hand out plans for Candy Dispenser 3. Teacher to model use of layout tools on pieces of wood needed to construct a candy dispenser. 4. Students collect the four sizes of wood material to construct their project. 5. Next, students use measuring & layout tools to help with setup and placement of parts to be cut on their project. 6. Using only hand tools, students will cut their pieces they have laid out after using the proper layout tools. 7. Teacher is to inspect pieces after cutting for approval to move onto the next step. 8. Students will use the stationary sander to sand (to the line), the proper size of their candy dispenser. 9. By reading their plan, students will follow	Candy Dispenser Rubric Finished project	Woodworkingteachers.orgt

		the steps by using the different drill presses setup to drill the various holes needed for their project. 10. Some students will learn about the different types of customizations available through the different technologies, i.e.- vinyl graphics, compucarve. 11. Students will attach a (plastic) jar to the top of their candy dispenser. 12. Apply finish		

Unit GRADE 6	Learning Objectives	Activities	Assessment Strategies	Resources
PLASTICS- How different are plastics	Students will be able to: • Work hands-on with plastic material • Understand that the properties of a material will govern the uses which it can be put to • Use basic hand tools properly	1. Talking about plastics. As a class, talk about the importance of plastics. Talk about where it is used (Automotive, Industrial, and Medical)... Recycling. 2. Review PowerPoint; Show class PowerPoint presentation on the various types of plastics. Have class answer questions as a whole at end of presentation. Show and describe the different samples the teacher has to display. 3. Complete Worksheet: May work in pairs to complete worksheet discussing plastics within our environment. 4. Provide tools: After appropriate demonstrations, have students build their plastic project. This project is to demonstrate how plastics (in different forms) can be used to manufacture with.	• If time allowed, the questions on the PowerPoint presentation could have been a quiz. • Worksheet on Plastics in the Environment • Observations of setup and proper use of hand tools. • Finished project ({acrylic} plastic key chain or flower vase) • Grading Rubric	RHAM Middle School- Technology Education. George Deliman

Unit Grade 7	**Learning Objectives**	**Activities**	**Assessment Strategies**	**Resources**
LAMPS	Students will learn basic electrical wiring as they plan and construct a table lamp. They will learn about construction and the various types of joints and fasteners. Students will construct a catch-all box that will utilize some of these concepts. Students will be able to: ☐ Acquire knowledge and understanding of o Materials required /suitable for making the Table lamp/Desk lamp. o Different types of Table lamps/Desk lamps used. ☐ Plan and organize your work ☐ Evaluate your own work according to your plan and original design ☐ Observe all the safety rules while working with electricity.	1. Students will explore basic electrical wiring by building and wiring a electric table lamp of their design. 2. Students participate in a technological enterprise within the classroom with a manufacturing unit by building 1 of 4 selected projects that must be identical. 3. Students will understand the proper procedure for constructing a variety of wood joints by building a catch-all box that incorporated some different type of furniture joints.	Assessments will be done through classroom worksheets, project rubrics, class participation, and visual inspection of students working in the computer lab and wood shop.	HowStuffWorks "How to Build a Lamp" home.howstuffworks.com/how-to-build-a lamp.htm

Unit Grade 7	**Learning Objectives**	**Activities**	**Assessment Strategies**	**Resources**
Rube Goldberg Machine	Students will be able to: •Practical representation of simple machines (prototype) •Engineering design process •Safe use of tools •Five elements of a technology system: goal, inputs, processes, outputs and feedback	The challenge is to invent and build a machine that will raise a flag (3 x 5 index card). The flag must be approved by the teacher prior to starting. • The machine must include at least three different simple machines. • It must start with a simple machine. • The invention must operate by itself after it is “tripped” or started. • Only the parts provided by the teacher can be used, other parts can be added with the teacher’s permission. • It must have four (or more) moveable stations (levers, pulleys, gears, springs, wheels & axles, etc.). • We will use reverse engineering starting with group discussions (groups to be	The final invention will be graded with a rubric. Observation of working Rube Goldberg invention.	lessonplanet.com/ building+a+rube+goldberg+machine

		2-3 students). • Each student will draw a thumbnail sketch then the teacher will help each group decide on a single plan. • Each person in the group (prior to starting construction) will draw a single detailed plan. o Each group will write a report (paragraph) on the origin or history of the flag. This will be due prior to the completion of the invention. Special Note: you must recycle the parts or take the invention home (or 5 points will be deducted from your grade).		

Unit	Learning Objectives	Activities	Assessment Strategies	Resources
Grade 8	Students will be able to express their preference for Related Arts class, and in Technology Education they get choose a project. As students learn about using a design brief and specifications they will apply that knowledge to clocks, CO_2 cars, whirligigs and other outside projects to name a few. They will also explore the diverse species of woods and discover how trees become lumber. Students will assemble a cutting board using some exotic woods such as Bubinga and Wenga.	1. Students will understand the different aspects of the design process through planning and building a clock. 2. Student will become familiar with the many species of wood types and the classifications. They will include some of these woods in a cutting board. 3. Students have learned over their time at MMS, many skills needed to take an idea and process through to end product. This project is where students will design, layout, and construct an independent project of their choice.	Assessments will be done through classroom worksheets, project rubrics, class participation, and visual inspection of students working in the computer lab and wood shop.	

Unit GRADE 8	Learning Objectives	Activities	Assessment Strategies	Resources
CLOCKS	Students will be able to: • Understand the different aspects of the design process • Recall the elements of design • List in order the steps to build a prototype	1. Teacher leads discussion on the elements and interpretation of a design brief. 2. Teacher hands out information packets on Design Briefs. 3. Teacher distributes the design brief 4. Class discussion and clarification of the requirements of the design brief.	Design Brief Worksheet Sketches Clock Rubric Visual Inspection	

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Boxes, Shelves, Luminaries & so on...	Students will be able to: Use a design process to modify products to improve their appearance, usefulness & function. • Select & safely use hand tools &power tools in the manufacture of products. • Demonstrate safe work habits when using tools, equipment & technical processes.	1. Concept sketch of designs & photos. 2. Working drawings on graph paper. 3. Manufacture parts 4. Assembly 5. Complete and finish	Project Rubric Visual inspection of project Observation of technique	Various websites

Unit GRADE 8	Learning Objectives	Activities	Assessment Strategies	Resources
C02 Cars	Students will be able to: Demonstrate an understanding for the design Process. Build a CO2 car according to specification. Calculate speed in MPH.	-Introduction to CO2 -Dragsters vs. SSC's -Newton's Third Law -Partial Video, Extreme Machines: SSC • Notes: The purpose of this introduction is to get students to base their thinking on "fast" rather than "dragster" in their design. The video gives students a good idea of what they will be designing, only at a smaller scale. It also effectively demonstrates technology's impact on our society culturally, politically, and historically.	Visual inspection. Grading Rubric. Data charts	http://en.wikipedia.org/wiki/CO2_dragster http://clozure.trainingo2.net/mobiletopic.php?s=CO2dragster

Unit GRADE 8	Learning Objectives	Activities	Assessment Strategies	Resources
Bird Houses & Feeders	Students will be able to: learn basic design skills: i.e. sketching orthographic drawings, sketching pictorial drawings learn and use measuring skills explore the nature of construction technologies	Acquire plans Watch demonstrations Acquire materials Scrape and plane material. Square board to good edge. Measure, cut pieces. Measure and cut short sides Glue and nail gable and short sides together and square them. (Picture) Glue and nail roof pieces to house box. (Picture) Measure, cut and build dormer. Build the dormer roof. (video) Apply the moldings to the box corners. (video) Measure, cut and build base. Shingle roof. (video) (Picture 1) (Picture 2) Measure, cut and build bay window. (Picture) Measure, cut and apply windows and doors. (video)	Rubric, Drawing/Plan, Question Worksheet, and Project	http://www.carbonschools.org/webpages/sfincher/lesson_plans.cfm?subpage=1164824

Unit **GRADE 8**	**Learning Objectives**	**Activities**	**Assessment Strategies**	**Resources**
Video Production – 45-60 sec. Commercial	Students will be able to: •acquire skills in video taping •cooperate with other students in small groups •create a video commercial that is between 45-60 seconds. •edit video footage •write a script to go along with the video	Activity: Create a 45 - 60 second commercial or infomercial. All marketing schemes are to be original. Requirements: ☐ Group must be 2 to 4 people. ☐ Infomercial must be between 45 and 60 seconds. ☐ Infomercial needs to be original. And material must be school appropriate. ☐ Contain a catch phrase ☐ Integrate music/sound and/or text ☐ Must contain Credits Evaluation Summary: ☐ Create a Power Point Presentation using the template but that exhibits commercial's theme. ☐ "Sell" your idea to your "clients" (peers and teacher) to gain "approval". ☐ Develop an original storyboard and script for commercial. ☐ Film each scene following your storyboard. ☐ Edit footage into your commercial/Infomercial (please see rubric for detailed criteria).	The assessments will be done using the rubrics (Attachments One-Four: Responsibility Sheet, Footage Rubric, Script Rubric, and Small-Group Finished-Product Rubric). Additionally, the teacher should observe the level of cooperation in each group. Peer participation as video critics.	Lessonplanet.org

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Hot Air Balloons	Students will be able to: Learn why hot air balloons fly Learn how temperature affects air density Use a degree scale to calculate altitude.	Man's first flight was in a hot-air balloon, and the fascination with the concept still endures to this day! In this competition, students design and engineer a hot-air balloon that they hope will travel as high as possible.	Grading Rubric Data collection charts Visual observation	www.howstuffworks.com/transport/flight/modern/hot-air-balloon.htm- http://juniorballoonist.com/ www.howstuffworks.com/transport/flight/modern/hot-air-balloon.htm-

Unit GRADE 8	Learning Objectives	Activities	Assessment Strategies	Resources
Water Rockets	Students will be able to: Identify potential and kinetic energies at the different points of the liftoff/launch. design, construct, test, and redesign model rockets use geometry to find the altitude of model rockets	Using plastic soft drink bottles, cardboard or Styrofoam food trays, tape, and glue, small teams of students design and construct rockets. A simple assembly stand assists them in gluing fins on their rockets, and a nose cone is mounted on the top. A small lump of modeling clay is inserted into the nose cone to enhance the rocket's stability in flight. The rocket is launched with a special launcher.	Inspect each team's rocket for the construction skill employed. Fins should be vertical and securely attached. The rocket should be stable. • Observe the flights and note how the recovery system designed by teams worked. Grading Rubric Data charts	http://www.nasa.gov/pdf/153406main_Rockets_Water_Rocket_Construction.pdf

Unit GRADE 8	Learning Objectives	Activities	Assessment Strategies	Resources
Let's go fly a Kite…	Students will be able to: Express themselves as an individual by applying personalized touches to their kites. Experiment with the three axes of movement (pitch, yaw, and roll). Calculate the surface area of the simple plane geometric shapes	Step 1: Students will first use their sketches and measurements to build their kites. Give them an example of how to do this. Draw a diamond shape on the board, find the measurement of one of its sides, and then show how to take that measurement to make one of the edges of the kite. An example of this would be to measure a wooden dowel, make marks indicating the measurement, and then cutting it to size. Allow students to begin working on constructing their kites. Many of them may need help, so walk around and help where you can. Encourage students to work together, though they will each need to make their own kites. They can use any of the materials provided. 2: As students finish the basic structure of their kites, they may begin to think of it more artistically and add color, designs, tails, or whatever they think would best represent themselves. Students will likely work at very different rates, so students who finish early are encouraged to help other students construct their kites. Step 3: Once students complete their kites, the will write about what kites symbolize to them. This can be in the form of a poem or journal entry.	Pattern evaluation Grading Rubric Visual Inspection As a math extension, students will be required to find the surface area of the kite.	Gareau - Patang Fighter / BFK - the Kite Store http://www.kitestore.com/kite97/3995.htm Belsky, Nancy Ann. Math Project Series - Building Kites, Flying High With Math. Dale Seymour Publications, 1995.

Unit GRADE 8	Learning Objectives	Activities	Assessment Strategies	Resources
Scale Model Project	Students will be able to: Understand the planning process you must go through before building something. Know how to use their knowledge of proportions to take a detailed sketch of an object and scale it to actual size. Understand how to calculate scale using ratio.	Student will build a scale model of choice. Students will measure the dimensions of their model object, multiply each dimension by a scale factor, and build a model using the multiplied dimensions. The problems used in this lesson consist of using similar objects in conjunction with scale factors that relate corresponding lengths of the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Proportional thinking is fostered by performing activities that compare ratios and use scale models	Grading Rubric Scaling Away activity sheet	**Artifice: Great Buildings Online** http://www.greatbuildings.com Lessonplanet.com