7th Grade Technology Education

The first focus of the 7th grade course is design, construct and test. They learn design aspects of a strong structure. They will build a Tower that has to first have functions as a windmill and pick up weight. The second purpose is to design a structure that will support 20 or more pounds.

The second focus is on alternative energy sources they will construct a Wind Turbine that has to power a light and they will take voltage readings and wind speeds from different distance from the fan. When they have their readings they will make a bar graph showing their results.

Course Information:

Frequency & Duration: Averaging 42 minutes; 5 days per week for 7 weeks

Text: Teacher prepared materials

Content: Tower/Windmill **Duration:** 4.5 weeks

Essential Question:	What makes a structure strong? Should structure move?
Skill:	• Describe how to design a strong structure. • Describe how to use design elements for a structure • Students will design a tower structure • Students will construct a tower • Students will test their designs
Instructional/Engagement Activities	
Assessment:	• Design a windmill blade • Students will test their blade design by picking up weight • Students will test their structure by supporting 20 or more pounds.
Resources:	Teacher prepared materials Video: Building Big Skyscrapers Video: Build em And Bust Them
Standards:	3.7.C Use of knowledge of material effectiveness to solve specific construction problems. 3.2.7.C Know and use the technological design process to solve problems.
Vocabulary:	1. Anemometer – an instrument for measuring and indicating the force or speed of wind. 2. Blade - An arm of a screw propeller, electric fan, or steam turbine. 3. Conductor - a material or object that permits an electric current to flow

easily. 4. Data - factual information such as measurments or statistcal information used as a basis for reasoning,discussion or caluculating. 5. Design – To creat or construct according to plan 6. Electron – an elementary particle consisting of a negative charge 7. Evaluate – to approximate the value, worth, or significance of something 8. Frame – a structure that provides support and shape 9. Generator – a device by which mechanical energy is changed into electrical energy by the movement of conductors through magnetic fields. 10. Graph – a diagram (as a series of one or more points, line segments, curves, or areas) that represents the variable in comparison with that of one or more other variables. 11. Induction – the movement of a conductor through a magnetic field, causing electrons to move in a conductor. 12. Kinetic – The forces of energy of motion. 13. Modify – to change 14. Motor – a rotating machine that changes electrical energy into mechanical energy 15. Multimeter – an electronic measuring instrument that has the ability to measure voltage, current and resistance. 16. Pitch – the angle of a propeller with respect to its plane of movement 17. Scientific Method – principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observations and experiments, and the formulation and testing of hypotheses 18. Speed – the rate of motion 19. Turbine – A device for transforming the movement of the wind into circular motion for the purpose of producing electricity 20. Variable – a symbol for a quanity that may assume any one set of values 21. Voltage Electric potential or potential difference expressed in volts 22. Velocity – rapidity of motion or operation, swiftness, speed 23. Wind – a natural movement of air of any velocity

Content: Turbine **Duration:** During the 7.5 weeks

Essential Question:	What are some renewable energy sources? What is a Turbine? What kind of voltage does a Turbine produce?
Skill:	• Student will construct an Eco-Wind Generator • Describe how the pitch of the blade effects both wind speed and voltage • Students will use an Anemometer to test wind speed from distances of 18",36', and 48' from the fan • Students will use a Multi-Meter to test voltages from the same distances 18', 36', and 48' from the fan
Instructional/Engagement Activities	
Assessment:	• Students will design the Turbine blade • Stunts will test their designs by lighting the bulb on the Turbine • Students will create a bar graph showing how the distance from the fan effects the wind speed • Students will create a bar graph showing how the distance from the fan effects the voltage
Resources:	Teacher prepared materials Video: Renewable Energy Video: Eco-Wind Gen
Standards:	3.2.7.B Apply process knowledge to make and interpret obsevations. 3.2.7.D Know and use the technological design process to solve problems 3.7.7.B Use appropriate instruments and apparatus to study materials.

Vocabulary:	**Same as Windmill**

Comments: