Hello everyone. Please make an effort to work on these papers and be creative. Try to use stuff you have at home before going out to buy new product. Use your own knowledge to help with your writing and any other online resource you can fine or books/magazines that you might have. The "Capturing the wind" paper is a good read and has some good follow up questions to work one. 843 307 6549 is my cell if anyone has any questions. My email is bteal@chesterfieldschools.org

Ag Career Poster Project Grading Sheet

Instructions: Make copies of this page and cut out the grading sheets below into squares. Staple a sheet to the back of each student's poster.

Student Name:

Ag Career Poster Project

Item on Product	Possible	Earned
Career title is clearly indicated	5 points	
Detailed job description (full paragraph – 5 to 6 sentences)	20 points	
Necessary skills to perform this job	15 points	
Educational requirements needed	10 points	
Positive and negative aspects of this job	10 points	
Expected salary and benefits	10 points	
Minimum of 5 pictures related to this career	10 points	
Information is written in complete sentences	10 points	
Neatness, and Creativity	10 points	
Total Points	**100 pts**	

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Information is written in complete sentences	10 points	
Neatness, and Creativity	10 points	
Total Points	**100 pts**	

Name Class Date

Milestones and Inventions in Ag Press Release

Objective: Write a press release statement on a milestone or an invention in agriculture history that has impacted humans and how we live.

Instructions:

1. Choose either a significant agriculture milestone or an invention in agriculture history to research. (For example, the first insect-resistant crop or the invention of pasteurization.)
2. You will need to research your milestone or invention and follow the guidelines below.
3. Write as if this just happened. However, put the correct historical date that it occurred in your statement.
4. Use the back of this paper to take notes on your research and then **write your final draft on your own paper.**
5. Write neatly. Be creative and instructive.

Press Release Guidelines:

Your press release must include these elements <u>in this order</u>:

1. FOR IMMEDIATE RELEASE: Write this in all caps as the first line on your press release
2. **Headline/Title:** make it informative not sensational
3. **Location:** City, State that the invention or milestone occurred
4. **Intro:** In one or two sentences sum up the event or invention and why it is important. Think of it this way: If this was the only part of the press release someone read, would they get the idea?
5. **Body Paragraphs:** Answer the 5 W's - who, what, when, where, and why - in short, concise paragraphs (2 to 4 sentences per paragraph).
6. **About:** A paragraph that includes a little more about the person or group that is responsible.
7. **Contact Info:** For the last paragraph write "For more information, contact" followed by the person, their place of employment or organization, and make up a phone number and email for them.
8. ###: Write three hashtags in the middle of the bottom of your paper. (This indicates the end of the press release.)

Invention Ideas for Research:

cotton gin
steam engine
grain reaper
combine
steel plow
grain elevator
irrigation
pasteurization
mechanized cotton picker
mixed chemical fertilizers
Mason jars
experiment stations/the Extension Service
refrigerated railroad car
barbed wire
hybridized corn
cream separators
gasoline tractor
bread slicing machine
mechanical tomato harvester
peanut butter
no-till method
first weed- and insect-resistant crop
cloning animals

Find more ideas in your textbook or online.

Milestones and Inventions Press Release Grading Sheet

Instructions: Make copies of this page and cut out the grading sheets below into strips. You can hand them back or staple one to each student's paper.

Student:

MILESTONES AND INVENTIONS IN AG PRESS RELEASE

Item	Possible	Earned
All elements of a press release are included and in proper order	20 pts	
Headline is informative but not sensational	15 pts	
Intro summarizes the main point	15 pts	
Body paragraphs answer the who, what, when, where, and why	35 pts	
Neatness, legibility, and accuracy	15 pts	
Total Possible	100 points	

Student:

MILESTONES AND INVENTIONS IN AG PRESS RELEASE

Item	Possible	Earned
All elements of a press release are included and in proper order	20 pts	
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Neatness, legibility, and accuracy	15 pts	
Total Possible	100 points	

Student:

MILESTONES AND INVENTIONS IN AG PRESS RELEASE

Item	Possible	Earned
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Intro summarizes the main point	15 pts	
Body paragraphs answer the who, what, when, where, and why	35 pts	
Neatness, legibility, and accuracy	15 pts	
Total Possible	100 points	

Ag Career Poster Project

Name Class Date

Research:

1. Using the internet or your textbook, research agriculture career options and occupations.
2. Choose **1** that interests you.
3. On the back of this page, record the following information:
    a. Job description including duties and responsibilities
    b. Necessary skills to perform this job
    c. Educational requirements needed
    d. Positive and negative aspects
    e. Expected salary and benefits

Here are a couple of websites to get you started:

www.gaaged.org/Careers_in_Agriculture/index.htm

www.ffa.org/index.cfm?method=c_job.CareerSearch

Project:

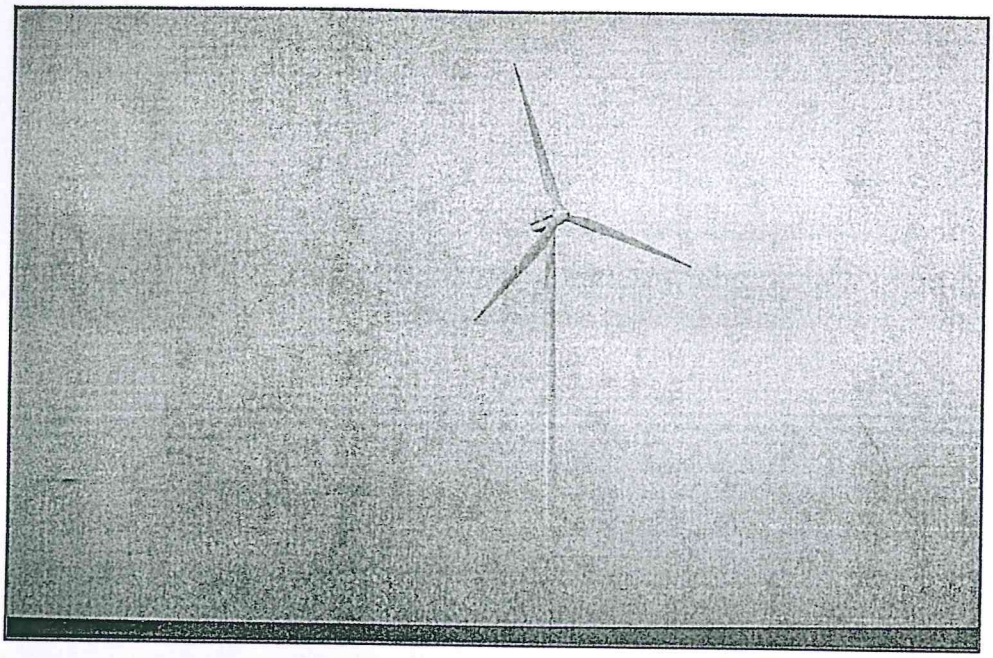
4. Get one large piece of construction paper (22" 28") or poster board in any color.
5. Get glue, scissors, and a marker that will show up on the color paper you have picked.
6. In big, bold letters write the title of the career you have selected at the top of your poster.
7. Then write full paragraph (5–6 sentences) describing the job which includes duties and responsibilities.
8. Use the other information you collected from your research and write it neatly and clearly and **in complete sentences** so that it can be easily read. (Plan the size of your writing accordingly.)
9. Find a minimum of five pictures related to the career you are presenting on your poster. They may come from the internet, magazines, personal photos, or you may draw your own illustrations.
10. Put your name on the back of your poster.

Grading – 100 possible Points

• Career title is clearly indicated	5 points
• Detailed job description (full paragraph)	20 points
• Necessary skills to perform this job	15 points
• Educational requirements needed	10 points
• Positive and negative aspects of this job	10 points
• Expected salary and benefits	10 points
• Minimum of 5 pictures related to this career	10 points
• Information is written in complete sentences	10 points
• Neatness, and Creativity	10 points

Capturing the Wind

ISSUE NO. 4



From a distance they remind the observer of thin white pinwheels blowing in the breeze.

But up close they stand like giant sentinels, towering over valleys and plains, sweeping their arms to capture the wind. What are these giants? They are wind turbines (often pronounced TUR bins), a hopeful solution to the world's constant search for **renewable energy**.

Wind has been a source of energy for thousands of years. It was used to sail trading ships across lakes and seas. It powered windmills to grind grain, and it is still used to pump water from underground wells. You can find wind everywhere because it is a natural occurrence. When the sun shines on the earth, the air becomes heated and starts to rise. As the hot air rises, cooler air moves in. All this movement creates wind. As long as the sun shines and the earth rotates, there will always be wind.

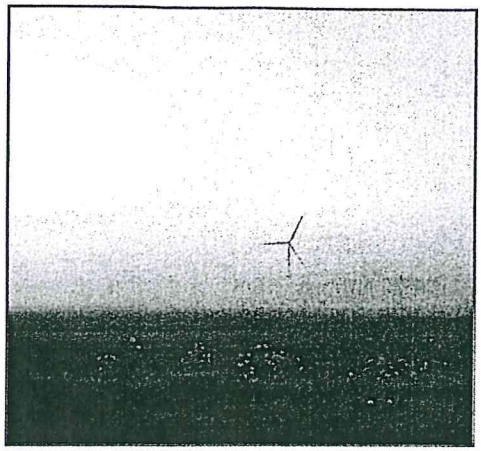
There are two basic types of wind turbines: the vertical axis wind turbine (**VAWT**) and the horizontal axis wind turbine (**HAWT**). The vertical axis turbines rotate around a shaft that is positioned in a vertical or up and down position. The blades capture the wind and spin around the shaft that is connected to a gearbox close to the ground. The gearbox increases the rotations of the shaft, causing the generator to produce electricity. VAWTs are good for small needs, such as a source of power for a single home. The benefit is that they can be used in more populated areas where space is limited, and they work with any type of wind direction.

The most widely used turbine is the HAWT which usually consists of two or three blades (three is the most common) connected to a hub. This rotor system connects to a horizontal or left to right shaft. HAWTs come in various heights, with the smaller ones being used for individual or small community energy, and the really tall ones being used for big commercial projects. A group of wind turbines in one area is called a **wind farm**.

The giant wind turbines that have been gaining popularity in the last several years are horizontal axis turbines. Most of these face the oncoming wind, and are operational starting at wind speeds of 8 - 12 miles per hour (mph). As the wind's **kinetic energy** turns the blades, a shaft spins at a speed of 30 – 60 rotations per minute (rpm). The shaft is connected to a gear box that accelerates the speed to 1000 – 1800 rpm. The generator uses this higher speed and converts this **mechanical energy** into electricity.

In order to take advantage of the stronger winds found at higher altitudes, HAWTs are placed on very tall towers. Depending on the size and output of energy needed, a commercial tower can range from about 165 to about 262 feet tall, taller than the Matterhorn ride at Disneyland, or the top of the Cape Hatteras lighthouse in North Carolina. The towers are usually made up of several tubular steel sections that are bolted together. The bottom of the tower is braced firmly to the ground on a thick concrete base.

The very top of the tower is the **yaw** deck upon which a big rectangular box, known as the nacelle, is placed. The nacelle houses the shaft that's connected to the rotor system, the



gear box, generator, cooling system, and controller. The gear box can weigh about 20 tons, while the generator and air cooler can weigh about 10 tons.

On the very top of the nacelle, directly opposite the rotor system, are an **anemometer** and a wind vane. The anemometer measures the speed of the wind and sends a signal to adjust the **pitch** of the blades, allowing the blades to turn in such a way as to capture the best angle of the wind. The wind vane measures the direction of the wind and sends a signal to the yaw deck so the turbine can be turned directly into the airstream.

The blades can vary in size with the average length for each blade at 150 feet. The amount of energy produced by the turbine is based in large part on the "swept area." This is the circular area the blades make as they turn. The larger the blades, the more potential power there is.

So how does the wind turbine move its electricity from the tower down to homes? Thick cables attached to the generator run down the length of the tower. These cables carry the low volts of electricity to a transformer that boosts the wattage up to a medium voltage of 20 – 36 Kilovolts (kV). The cables then send the electricity to the **power grid** where it's distributed to homes and businesses. A HAWT can generate a lot of energy. A 1 MW (megawatt) turbine can produce enough energy to power around 250 homes.

So why isn't everyone going out and building turbines to power the nation? For one thing, wind is unpredictable. You don't always know when it's going to blow, how strong the winds will be, and how long will the gusts last. Also, some areas aren't as windy as others, so it wouldn't be cost effective to put up a tower with a price tag of several million dollars if it won't produce enough energy to pay for it. And turbines can't run in super strong winds. In fact, the turbines automatically shut down when speeds reach over 50 mph. Companies conduct extensive studies to find the windiest and safest places to place their turbines.

Some people don't like the look of the turbines and resist having them built in their communities. There have been complaints about increased noise levels as the rotors turn and about the red blinking aviation lights seen at night. Others criticize the increased numbers of bird and bat deaths caused by these creatures flying into the sweeping blades. Still others think this new interest in wind energy is a passing fad, and when that curiosity fades, the old turbines will become giant pieces of junk littering the countryside.

For now, wind energy is here to stay. Who knows? Maybe a wind turbine will be coming to your horizon soon.

THE POWER OF WIND

The Department of Energy (DOE) hopes that by 2030, 20% of all energy produced in the U.S. will be from wind energy. Perhaps this explains the growth in wind turbine construction over the last few years. A report by the DOE in mid-2012 stated that the U.S. had reached a 50,000 MW wind power capacity. This means that under the best of conditions, this amount of power could be generated from all the turbines in the country. That is enough energy to power all the homes in California.

New jobs are created as qualified technicians are needed to maintain these delicate pieces of machinery. Wind technicians need to know their way around electrical, computer, and **hydraulic** systems. They also need to be energetic to climb a ladder over 200 feet tall, not be afraid of heights as they stand atop a nacelle 20 stories high, and be able to troubleshoot in adverse weather conditions.

Q&A

Reading Comprehension for "Capturing the Wind"

1. How was and is wind used as a source of energy?
2. Explain how a VAWT works.
3. Explain how a HAWT works.
4. What wind speed is needed to start a horizontal axis turbine?
5. The shaft in a horizontal axis wind turbine spins at around 30 to 60 rotations per minute. How much faster does the gear box make the shaft turn?
6. About how tall are most commercial towers?
7. What does an anemometer do, and where is it on the nacelle?
8. What is the "swept area?"
9. What is the DOE?
10. What does the DOE hope will happen by 2030?
11. What are some things a wind technician needs to know for the job, and what are some things they need to be comfortable with?
12. Why don't some people want wind turbines in their communities?

Critical Thinking Questions

1. Why do you think HAWTs are more popular than VAWTS?
2. What do you think are some of the benefits of having wind turbines in your community?
3. Do you think wind turbines are a good source of energy? Why or why not?
4. Why do you think companies need to conduct extensive studies before they build a turbine in a particular area?

VOCABULARY

anemometer: a device used to measure wind speed

HAWT: horizontal axis wind turbine

hydraulic: moving or operating something through the use of pressurized water or liquid

kinetic energy: energy of an object in motion

mechanical energy: energy caused by the rotation of an object

pitch: twisting a blade so as to allow the wind to flow smoothly over it

power grid : transmission lines, cables, and towers that transfer electricity from a power source to a home/business

renewable energy: natural and unlimited sources of energy

VAWT: vertical axis wind turbine

wind farm: a group of wind turbines

yaw: angling an object to the left or to the right

WIND ACTIVITY

Further Exploration for "Capturing the Wind"

1. If a 1MW horizontal wind turbine has a 200 foot diameter, what would the swept area be? _____

   The "swept area" of a horizontal axis wind turbine is measured the same way you measure the area of a circle: $A = \pi r^2$ (Area equals pi times the radius squared.)

   Remember:
   - pi: $\pi = 3.14$
   - diameter is 2 times the radius: $d = 2r$
   - radius is ½ the diameter: $r = ½\ d$

2. Using what you have learned from the wind power article (or through more internet research), create an infographic on how wind becomes electricity. Infographics are visual representations of information, data or knowledge. For example, a map is a simple infographic. Infographics use more images to represent data and less text so the information is easy and quick to understand. (See the example below.)

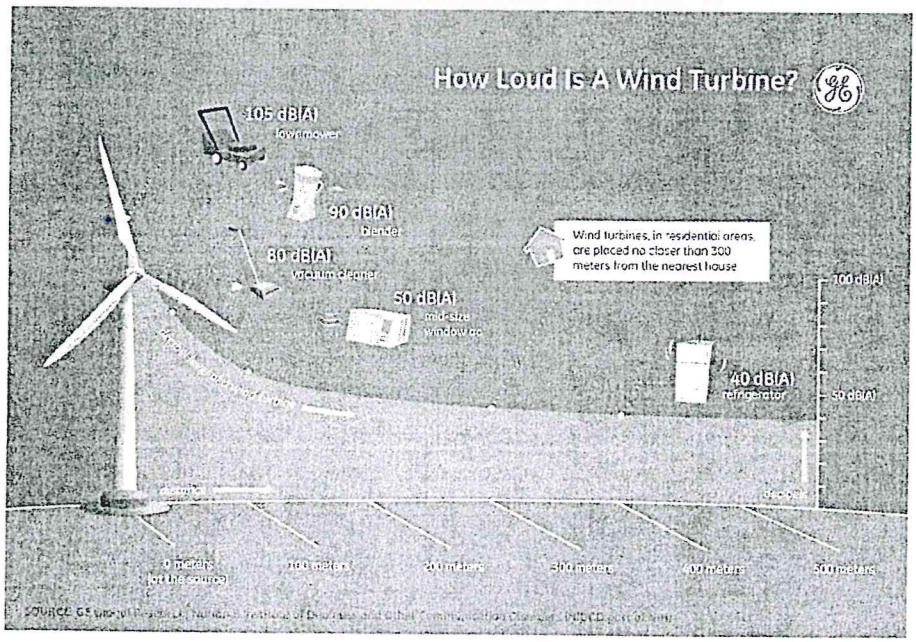
   The purpose of your infographic is to educate viewers on wind power systems. **Show the wind moving the turbine to produce electricity, and then how that electricity moves to a power station to distribute 1MW of energy to 250 homes.** Your infographic can also include how wind becomes power, the parts of a wind turbine, any numerical data about wind farming, and advantages vs. disadvantages

   Get a plain sheet of paper from your instructor along with markers or colored pencils. Follow the grading guidelines and include each of the elements listed.

What to Include/Grading:

- 10 pts. Title (something catchy, for example "Blown Away" or "Ride the Wind")
- 20 pts. Illustrations/pictures/ diagrams of turbines and how the electricity is converted
- 15 pts. Labels and descriptions
- 15 pts. Data (numbers) shown
- 20 pts. Overall use of color and creativity
- 20 pts. Neatness and effort

You can make different sections of your infographic stand out with pictures, borders, bold words, and colors. Creativity counts. Be sure to write all information neatly and clearly so that it is easy to read.



Infographic Example