



ENERGY CAREERS

CAREER FOCUS

All WhyPower Careers!

ACADEMIC FOCUS

Career education lessons.

Contents of this lesson plan

1. Teacher Preparation	
2. Part One	EXPLORE (directed inquiry)
3. Part Two	REFLECT (group discussion)
4. Part Three	ACCOMPLISH (the assigned task)
5. Part Four	CONNECT (to standards and real life)
6. Student connect Worksheet	

In previous WhyPower activities, students learned about green building, daily energy production, power sources, running power to communities, and analyzing power requirements. They collected up to ten badges and increased their Whyville salary. We now build on the student's experience in collecting clams, collecting badges, and increasing their salary to focus on the virtual careers in WhyPower, and on what can be learned from analyzing salary and the differences between career badges. Students will examine the different skills required for different jobs and the differences between technical and professional jobs. An additional worksheet that can be started during the Accomplish section helps students think about the relationship between WhyPower careers and real-world jobs.



ENERGY CAREERS in Whyville

TEACHER PREPARATION

Review this prior to class!

Instructional Approach

This lesson plan uses directed inquiry to lead students to discover the questions they should ask about building and running a green home, and the answers to those questions.

Teacher's Role

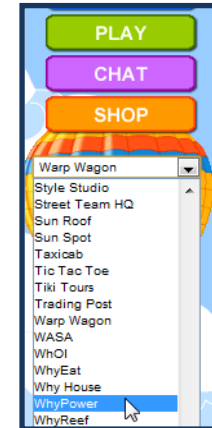
The teacher's role is classroom facilitator and expert consultant. You will lead students to explore and help them when they get in trouble. Many students will learn much more than is formally included in this lesson plan, and will also be able to help other students.

Materials

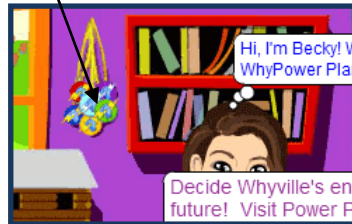
1. Computers with Internet access and confirmed access to Whyville
2. CONNECT worksheet and Career Planner worksheet included in this lesson plan.

Follow these instructions to prepare to facilitate your class.

1. Log into Whyville and select *WhyPower* from the Bus menu (see picture →).
2. Click the link *WhyPower Inside*.



3. Look at your career badges earned clicking on the badges hanging on the wall. Note which badges have been earned, and which have not.



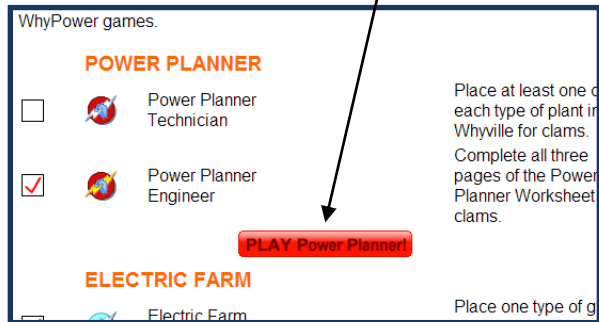


ENERGY CAREERS in Whyville

TEACHER PREPARATION

Review this prior to class!

4. Choose one activity, and re-visit that activity. Figure out what it takes to earn the *technician* badge, and what it takes to earn the *engineer* badge.

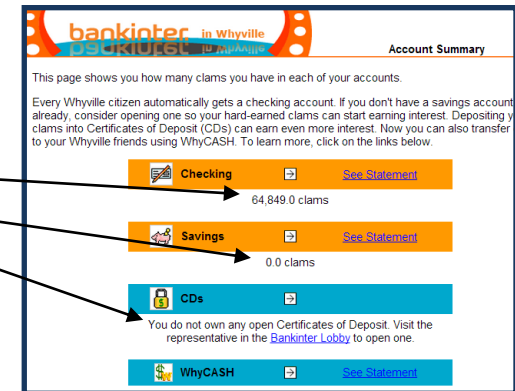


This example shows the link to Power Planner, but you could also visit one or more of Green Build, Peak Power, Electric Farm, or PowerLine.

5. Visit the salary ledger and write down the salary you're earning in all the WhyPower activities.



6. Determine your clam account balance and which financial instruments are holding your clams.



7. Visit your checking account statement and review how you've been spending your clams.





ENERGY CAREERS
in Whyville

TEACHER PREPARATION
Review this prior to class!

ENERGY CAREERS

Technician programs are generally available in community and technical colleges. They are either certificate or associate degree programs and have specific entry requirements, such as a high school diploma or GED. There may be specific course or knowledge prerequisites. Some programs have physical prerequisites (like climbing for wind energy technicians). There will be a hands-on element to technician training.

Engineer preparation programs will normally take place in four-year institutions of higher education and have more stringent academic prerequisites and more academic coursework. Because these will be Bachelor's degree programs, there will be course degree requirements that are not immediately connected to an engineering career, such as English, History, or the Arts.

A two-year community or technical college education can be a pathway to a four-year program. Two-year Associate Science or Associate Arts graduates can often enter a four-year program as a third-year student. Costs for education can be significantly reduced because most community and technical college programs have tuition significantly lower than a four-year program.

Students with a high school academic record that is not strong may find the community/technical program a good route to a four-year program. It is also the pathway that many older students use when they discover their interests.

Green opportunities for students in the building fields are currently best associated with LEED certification (<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988>). Builders are finding incentives for building LEED certified buildings and even rehabilitating older buildings to meet LEED certification. Opportunities for wind technicians and engineers tend to be focused on the design, construction, and maintenance of wind farms, extensive installations of wind turbines. Home and corporate installations of smaller wind turbines have not yet found large-scale acceptance. Solar installations require different skill sets depending on the type of solar installation. Solar Thermal installations are generally large power generation settings. Photovoltaic solar can be found in large scale power generation settings, but these are also the solar panels that are becoming popular roof installations. There are tax incentives for the installation of home and business energy installations which not only provide power to the home or business and also put excess power back into the electrical grid, effectively making the electrical meter run backwards.



ENERGY CAREERS in Whyville

PART 1 – EXPLORE

Do this for the first 20 minutes of class

Starter Question 3 minutes

What is the difference between a technician and an engineer?

Perform these *Teacher Actions*

Do these in the order indicated

1. ENGAGE (3 minutes)

Ask students the Starter Question. Facilitate a class discussion for five minutes and help the students take ownership of the lesson.

2. DIRECT (2 minutes)

Direct students to log into Whyville, go to *WhyPower*, and then to *WhyPower Station*. Ask them to explore what it means to be a technician, and what it means to be an engineer. Have them visit their WhyPower career badge page; visit at least one WhyPower activity; review their salary and which activities are contributing, and review their recent account activity at Bankinter.

3. COACH (15 minutes)

Wander around the room, encourage students to help each other, and help the students if they are having trouble finding information. Ask students what they have discovered about technicians and engineers they didn't know.

Expect this *Student Experience*

You should see your students experience the following

ENGAGE

Students take ownership while they are discussing a question that matters to them.

EXPLORE

Within three minutes of the start of the lesson, students are logged into Whyville and exploring.



ENERGY CAREERS in Whyville

PART 1 – EXPLORE

Do this for the first 20 minutes of class

WHERE DO THE LESSONS APPEAR? Recognize where the core content shows up.

Where is the badge information?

WhyPower Jobs

In real life, there are lots of exciting careers in the field of Energy and Power Generation. Some jobs require vocational training, and some require a college or graduate degree.

In Whyville, you can earn technical level and professional level badges by playing WhyPower games.

PEAK POWER

<input checked="" type="checkbox"/>		Power Plant Operator	6 clams of salary	Discover the basic parameters of power plants and win the first three levels of Peak Power.
<input type="checkbox"/>		Power Plant Engineer	12 clams of salary	Juggle cost and environmental impact to win levels 4 to 6!

PLAY Peak Power!

GREEN BUILD

<input checked="" type="checkbox"/>		Home Energy Technician	6 clams of salary	Design a small and a large home to run for one year within budget. Think in the long term and design both sizes of homes to run for twenty years within budget!
<input type="checkbox"/>		Home Energy Engineer	8 clams of salary	

PLAY Green Build!

Specific activity example: Finding technician vs. engineering differences in Green Build

We've set up 4 challenges below. By solving them, you will increase your salary by 3 clams each for the Technician Level challenges and 4 clams each for the Engineer Level ones, for a total of 14 big ones! In addition, you will earn badges for qualifying to be a Home Energy Technician and a Home Energy Engineer.

	Technician Level	Engineer Level
	<input type="checkbox"/> 1 Year	<input type="checkbox"/> 20 Years

The Power Grid consists of Power Plants, Electrical Substations, and places where electricity is used.

HOW TO PLAY

In this game, you will measure the voltage and current at various points in the Power Grid to help you understand how electricity is efficiently delivered to your home.

Your first job is to measure the voltage and current at each interesting point in the Power Grid. To do that, click on all the Power Plants, Substations, and Cities on the Power Grid map, and then move to each point in the close-up views. This will earn you the PowerLine Technician badge.

Once you have measured all the voltages and currents, answer the questions about the measurements you have just taken. If you answer correctly, you'll be given the PowerLine Engineer badge.

How does your bank account look?

bankinter in Whyville Account Summary

This page shows you how many clams you have in each of your accounts.

Every Whyville citizen automatically gets a checking account. If you don't have a savings account already, consider opening one so your hard-earned clams can start earning interest. Depositing your clams into Certificates of Deposit (CDs) can earn even more interest. How you can also transfer to your Whyville friends using WhyCASH. To learn more, click on the links below.

Checking: 64,849.0 clams [See Statement](#)

Savings: 0.0 clams [See Statement](#)

CDs: [See Statement](#)

You do not own any open Certificates of Deposit. Visit the representative in the [Banker's Lobby](#) to open one.

[WhyCASH](#) [See Statement](#)

Power Planner Worksheets

Scion Driving School

WhyPower Peak Power

WhyPower

Checking Balance: 64,849.0 clams Current Salary: 74 clams

Month: Dec 2012 [Go](#)

Date	Transaction	Amount
Dec 5 9:54 PM	Whyville Salary	74
Dec 3 11:00 PM	Whyville Salary	74



ENERGY CAREERS in Whyville

PART 2 – REFLECT

Do this for the next 10 minutes of class

	Perform these <i>Teacher Actions</i> <i>Do these in the order indicated</i>	Expect this <i>Student Experience</i> <i>You should see your students experience the following</i>
1.	<u>GATHER</u> Give students a one-minute warning that exploration time is almost over. Then, have the students turn off their screens quickly.	<u>GATHERING</u> Students wrap-up their self-guided exploration and turn their full attention to the discussion.
2.	<u>FACILITATE</u> Lead a discussion, considering the suggested questions below.	<u>REFLECTING</u> Students share and refine their ideas in group discussion.

	Question	Expected Answer
1.	Name some of the career badges.	Home Energy Technician & Engineer; Power Plant Operator & Engineer; Electric Farm Technician & Engineer; Powerline Technician & Engineer; Power Planner Technician & Engineer
2.	Are the skills same for each badge?	No. They are custom for each job.
3.	Are technician and engineering skills the same? If no, how are they different?	Technician skills are about exercising a skill well, right now! Engineering skills are sometimes more complicated and often require planning ahead and anticipating the impact of decisions.
4.	Which jobs appeal to you?	



ENERGY CAREERS
in Whyville

PART 3 – ACCOMPLISH

Do this for the next 15 minutes of class

	Perform these <i>Teacher Actions</i> <i>Do these in the order indicated</i>	Expect this <i>Student Experience</i> <i>You should see your students experience the following</i>
1.	<u>DIRECT</u> Tell the students that their goal is to start the Career Planner worksheet. You might consider assigning completion of that worksheet as homework. There are questions they may not immediately have answers to. Encourage them to work together or form groups to help them answer the questions. The primary goal is to get the students thinking about these issues.	<u>ACCOMPLISHING</u> Students start the Career Planner Worksheet.
2.	<i>Transition to</i> <u>CONNECT</u> Direct students to complete the CONNECT worksheet.	<u>CONNECTING</u> Students complete the worksheet, demonstrating their mastery of relevant standards and their understanding of real world applications.



ENERGY CAREERS in Whyville

PART 4 – CONNECT

Five Minute Student Analysis

Name and Date		
Class Period and Whyville ID		
Technician Jobs		
1. What is the difference between the skills needed to become a Home Energy Technician (Green Build) vs. a Power Plant Operator (Peak Power)?		
2. a) What is a Home Energy Technician's salary? b) A Power Plant Operator's salary? c) Are they the same or different? Is that OK? Explain your reasons.		
Engineer Jobs		
3. What is the salary difference between a Power Plant Engineer vs. a Power Plant Technician?		
4. What is the skill difference between a Power Plant Engineer vs. a Power Plant Technician?		
1. How would you describe the difference between <i>technician</i> jobs and <i>engineer</i> jobs?		
2. Can you think of one real-world energy career?		



ENERGY CAREERS in Whyville

CAREER PLANNING WORKSHEET

Name and Date					
Class Period and Whyville ID					
Select one job that interests you. You will answer the rest of the worksheet for the job you select.					
✓ Green Build <ul style="list-style-type: none"> Home Energy Technician Home Energy Engineer 	✓ Peak Power <ul style="list-style-type: none"> Power Plant Operator Power Plant Engineer 	✓ Electric Farm <ul style="list-style-type: none"> Electric Farm Technician Electric Farm Engineer 	✓ PowerLine <ul style="list-style-type: none"> Powerline Technician Powerline Engineer 	✓ Power Planner <ul style="list-style-type: none"> Power Planner Technician Power Planner Engineer 	
What type of certificate or degree is required for you to enter the job selected? Are there different options?					
Identify at least two schools/colleges that provide the education and training required for that job.					
For each of the job training programs identified in #2, what are the high school preparation requirements?					



ENERGY CAREERS in Whyville

CAREER PLANNING WORKSHEET

What are the advancement paths for a technician who might later like to get a higher salary and become an engineer?	
What special skills would the technician need? What skills would be helpful, but not required?	
What are the future prospects for this field? Will there be more or less opportunities for these jobs in the future? (Provide supporting evidence for your answer.)	
What are some companies hiring for the kind of jobs you researched? <i>(EXTRA CREDIT: Find and attach ads for this type of job!)</i>	



ENERGY CAREERS
in Whyville

STANDARDS MET

Texas Essential Knowledge and Skills (TEKS)
8th Grade

All TEKS listed are impacted by this lesson plan. **Boldfaced TEKS** represent the focus of the lesson plan.

TEKS: Career Investigation

- (2) The student knows how to locate, analyze, and apply career information. The student is expected to:
 - (A) access career information using print and on-line resources to complete an educational and/or training plan for a career pathway;
- (3) The student knows that many skills are common to a variety of careers and that these skills can be transferred from one career opportunity to another. The student is expected to:
 - (A) compile a list of multiple career options matching interests and aptitudes; and
- (6) The student knows the process of career planning. The student is expected to:
 - (A) list and explain the steps in the decision-making process;
 - (C) identify high school courses related to specific career choices in the student's interest area;**
 - (E) list and explain educational and/or training alternatives after high school; and**
 - (F) prepare an educational and career plan that begins with entry into high school and continues through a postsecondary educational and/or training program. prepare an educational and career plan that begins with entry into high school and continues through a postsecondary educational and/or training program.

TEKS: Exploring Careers

- 1) The student explores personal interests and aptitudes as they relate to education and career planning. The student is expected to:
 - (B) explore the career clusters as defined by the U.S. Department of Education;
 - (C) summarize the career opportunities in a cluster of personal interest;
 - (D) research current and emerging fields related to personal interest areas;**
 - (E) determine academic requirements in career fields related to personal interest areas;**
 - (G) research educational options and requirements using appropriate technology.**



ENERGY CAREERS
in Whyville

STANDARDS MET
Texas Essential Knowledge and Skills (TEKS)
8th Grade

- (2) The student analyzes personal interests and aptitudes regarding education and career planning. The student is expected to:
 - (A) create a personal career portfolio;
 - (B) make oral presentations that fulfill specific purposes using appropriate technology;
 - (C) develop and analyze tables, charts, and graphs related to career interests;
 - (D) determine the impact of technology on careers of personal interest; and
 - (E) identify entrepreneurial opportunities within a field of personal interest.
- (3) The student analyzes college and career opportunities. The student is expected to:
 - (A) determine academic requirements for transition from one learning level to the next;
 - (B) explore opportunities for earning college credit in high school such as advanced placement courses, International Baccalaureate courses, dual credit, and local and statewide articulated credit;
 - (E) demonstrate decision-making skills related to school and community issues, programs of study, and career planning; and
- (4) The student evaluates skills for personal success. The student is expected to:
 - (C) use a problem-solving model and critical-thinking skills to make informed decisions;
 - (E) effectively use information and communication technology tools; and
 - (F) identify skills that can be transferable among a variety of careers.
- (6) The student demonstrates an understanding of personal financial management. The student is expected to:
 - (A) compare the advantages and disadvantages of different types of banking services;
 - (B) simulate opening and maintaining different types of bank accounts;
 - (C) simulate different methods of withdrawals and deposits; and
- (8) The student identifies and explores technical skills essential to careers in multiple occupations, including those that are high skill, high wage, or high demand. The student is expected to:
 - (A) complete actual or virtual labs to simulate the technical skills required in various occupations; and
 - (B) analyze the relationship between various occupations such as the relationship between interior design, architectural design, manufacturing, and construction on the industry of home building or the multiple occupations required for hospital administration.



ENERGY CAREERS
in Whyville

STANDARDS MET

Texas Essential Knowledge and Skills (TEKS)
8th Grade

TEKS: Career Portals

- (1) The student explores one or more career clusters of interest. The student is expected to:
 - (A) identify the various career opportunities within one or more career clusters; and
 - (B) identify the pathways within one or more career clusters.
- (2) The student explores pathways of interest within one or more career clusters. The student is expected to:
 - (A) investigate career opportunities within the pathways;
 - (B) explore careers of personal interest;
 - (C) research the academic requirements for careers of personal interest;
 - (D) research the certification or educational requirements for careers of personal interest; and
 - (E) describe the technical-skill requirements for careers of personal interest.
- (3) The student explores programs of study. The student is expected to:
 - (A) compare levels of education for careers of personal interest;
 - (B) identify the academic and technical skills needed; and
 - (C) develop a personal program of study for at least one career.
- (4) The student explores the professional skills needed for college and career success. The student is expected to:
 - (A) articulate the importance of strong academic skills to meet personal academic and career goals;
 - (B) explore the importance of curricular, extracurricular, career preparation, and extended learning experiences;
 - (C) develop a personal six- or eight-year achievement plan that incorporates rigorous academic and relevant enrichment courses;
 - (D) explore the steps required to participate in a variety of career and educational opportunities, including, but not limited to, entry-level employment, military service, apprenticeships, community and technical colleges, and universities;
 - (E) identify professional associations affiliated with a specified program of study;
- (6) The student explores labor market information. The student is expected to:
 - (A) analyze national, state, regional, and local labor market information;
 - (B) cite evidence of high-skill, high-wage, or high-demand occupations based on analysis of labor market information; and



ENERGY CAREERS in Whyville

STANDARDS MET

Texas Essential Knowledge and Skills (TEKS)
8th Grade

Blooms (Taxonomy):

X	Knowledge: arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, reproduce state.
X	Comprehension: classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate
X	Application: apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write.
X	Analysis: analyze, appraise, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.
X	Synthesis: arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, set up, write.
X	Evaluation: appraise, argue, assess, attach, choose compare, defend estimate, judge, predict, rate, core, select, support,

Instructional Strategies:

X	Identifying similarities and differences
X	Summarizing and note taking
X	Reinforcing effort and providing recognition
	Homework and practice
X	Nonlinguistic representations
X	Cooperative learning
X	Setting objectives and providing feedback
X	Generating and testing hypotheses
X	Cues, questions, and advanced organizers