Harry Spotter and the Chamber of Windy Myths Teacher Guide

★Concepts

- Wind turbines do not produce excess sound.
- Properly sited wind turbines do not kill birds and bats.
- Wind energy is reliable and predictable.
- Siting a wind turbine is critical to its success.

Vocabulary

- anemometer
- bickering
- efficiently
- hideous
- menagerie
- migration
- reliable
- rhythmical
- siting (a wind farm)
- sustained

☑Assessment

1. Why did Professor Dieseldore invite Professor Huggdatreaz to teach the windseekers class at Hogwatts? *(Huggdatreaz is an expert in siting wind turbines. Hogwatts is looking to increase their electric capacity by installing a wind turbine.)*
2. What makes a location a good spot for a wind turbine? *(Predictable, consistent, parallel winds of around 5-8 miles per hour; wildlife that won't be disturbed by the wind turbines; dual-use locations that can be used for farming or grazing, as well as the turbines.)*
3. What makes a location a bad spot for a wind turbine? *(Inconsistent winds; wind speeds that are too high; winds that blow in a direction the blades cannot use; migration routes for birds or bats; locations with many other tall structures.)*
4. What is one myth most people believe about wind turbines? How would you convince them this is not true? *(Myths may include: large numbers of bats or birds are killed by the spinning blades; wind turbines are noisy; electricity generated by wind power is unreliable; a wind turbine may be successfully put anywhere.)*

Extensions

- The principal of your school is thinking about adding a wind turbine to the property to generate electricity. Your class is responsible for deciding if this is a good idea and where the turbine should be located. Write a persuasive speech convincing your principal why she should or should not add a wind turbine.
- Research wind energy and wind turbine technology. Prepare informative digital presentations, movie clips, or expo boards on these topics:
  - Wind, a renewable energy resource
  - Parts of a wind turbine
  - Siting a wind farm
  - Wind turbines generate electricity
  - Wind energy myths
- Perform *Harry Spotter and the Chamber of Windy Myths* for other students in your school and teach them about wind energy using the projects students created.

Cast of Characters

- **Halley:** An intelligent student
- **Rodney:** A student that sometimes struggles academically
- **Harry Spotter:** A student that enjoys flying
- **Professor Huggdatreaz:** The science teacher
- **Cloudia:** A student
- **Breezus:** A student
- **Class:** Class or cast

Harry Spotter and the Chamber of Windy Myths

Characters

HALLEY: An intelligent student

RODNEY: A student that sometimes struggles academically

HARRY SPOTTER: A student that enjoys flying

PROFESSOR HUGGDATREAZ: The science teacher

CLOUDIA: A student

BREEZUS: A student

CLASS: Class or cast

Scene I

(Setting: A classroom at Hogwatts School.)

HALLEY: I'm so excited about this new class. This professor is really supposed to be energetic!

RODNEY: I just hope I pass this one.

HARRY: We'd better hurry, or we're going to be late.

(They enter the classroom and find seats.)

PROFESSOR HUGGDATREAZ: Welcome to Windseekers Class. This is a new class at Hogwatts. Your first project will impact the entire school. Due to increased enrollment, our current electrical capacity is no longer meeting our needs.

HALLEY: *(Waving hand excitedly)* Is that why the lights went off in our dorm last night? I couldn't finish reading ahead for my classes.

PROFESSOR HUGGDATREAZ: Yes, Halley. Professor Dieseldore invited me to teach this class since I'm an expert in siting wind farms. You are going to assist me in picking the perfect location for a wind turbine.

CLOUDIA: Cool.

RODNEY: (*Quietly to Harry)* Do you know what we're talking about?

HALLEY: Shhhhh…

PROFESSOR HUGGDATREAZ: Can anyone tell me what wind energy is?

(Halley waves her hand wildly.)

PROFESSOR HUGGDATREAZ: Harry?

HARRY: The stuff that blew out the candle last night.

PROFESSOR HUGGDATREAZ: One point for Harry. But, wind is much more. Breezus?

BREEZUS: Wind is magic. It helps our broomsticks fly and fills dragons' wings.

HALLEY: *(Shouts)* Wind is moving air.

PROFESSOR HUGGDATREAZ: One point for Breezus. Yes, wind does seem like magic. Halley, you would receive points too, if you'd waited to be called on. Yes, wind is moving air that we can harness to do work. Class, repeat after me: wind is moving air—energy is there.

CLASS: Wind is moving air—energy is there.

PROFESSOR HUGGDATREAZ: For homework tonight, everyone needs to find the perfect location for us to build a wind turbine here at Hogwatts. Class dismissed.

RODNEY: A wind what?

HARRY: A wind turbine. It's a modern windmill. The blades catch the wind and turn it into electricity.

HALLEY: It converts nature's motion energy into electrical energy.

RODNEY: Thank you, HARRY. Halley, how far ahead did you read?

HARRY: Stop bickering, let's get this homework done.

CLASS: *(As they exit the classroom)* Wind is moving air—energy is there. Wind is moving air—energy is there.

Scene II

(Setting: The next day in Windseekers Class.)

PROFESSOR HUGGDATREAZ: It's time to share your ideas. Where should we build the wind turbine?

(Halley waves her hand wildly.)

PROFESSOR HUGGDATREAZ: Breezus?

BREEZUS: In the middle of the Frightening Forest, so we don't have to see it. The giant tower and spinning blades will blend right in with the trees and won't ruin our view.

CLOUDIA: But I think the wind turbine will look cool. I don't want to go into the Frightening Forest to see it.

PROFESSOR HUGGDATREAZ: Although some people don't like the look of turbines, that shouldn't be our first consideration.

HALLEY: And the trees in the forest would block the wind, so it would defeat the purpose.

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RODNEY: *(Sighs loudly)* So I guess that means my idea of putting the turbine inside of the science building wouldn't work either?

PROFESSOR HUGGDATREAZ: That's right, Rodney. Any other suggested site locations? Remember what wind is?

CLASS: Wind is moving air—energy is there.

CLOUDIA: How about near Zagrid's house, or even on his roof?

HARRY: But won't the noise keep him and his menagerie up at night?

PROFESSOR HUGGDATREAZ: Actually, the sound from a wind turbine isn't as loud as you might think given how big it is and how much energy it makes. The sound it makes is a rhythmical whooshing, sort of like the sound of a dragon's wings flapping—whoosh, whoosh, whoosh. Who can see why building it on the roof wouldn't work?

BREEZUS: Same reason as the woods, because the wind could be blocked. There can't be anything near it that would block the wind before it gets to the blades. His house is so tiny, even some of the trees are taller.

HALLEY: How about the roof of the school? It is the tallest building at Hogwatts, so nothing will block the wind's path.

PROFESSOR HUGGDATREAZ: Good suggestion, Halley, however it won't work.

RODNEY: Halley's wrong?

PROFESSOR HUGGDATREAZ: Sure, Hogwatts' roof is tall, but does anything else use that airspace?

CLOUDIA: The Owlery is up there. Our owls could be hit by the spinning blades!

BREEZUS: Good thing I don't have an owl.

PROFESSOR HUGGDATREAZ: Bird flight paths are a major consideration in siting a wind project. We've learned from past mistakes that wind turbines shouldn't be built near migration routes. By avoiding these areas, there is a much smaller chance of wildlife being injured.

HARRY: This shouldn't be that hard. It's just wind—you can't even see it!

CLASS: Wind is moving air—energy is there.

RODNEY: Does this mean that if we find a perfect location, we'll only have power when there is a storm and it's really windy?

HALLEY: No, Rodney. Current technology allows a large wind turbine to run efficiently on winds as low as 5-8 miles per hour.

CLOUDIA: So, we need to find a location away from tall structures that might block the wind, with a wind speed of at least 5-8 miles per hour, and in a place that won't disturb wildlife.

BREEZUS: Maybe there's a windseeker spell to help figure this out!

PROFESSOR HUGGDATREAZ: Five points to Cloudia for summing up the discussion so nicely. For homework tonight, you can take anemometers out to check wind speed at various locations. Remember, the tower could be up to 100 meters high, so you will have to find a way to get to that height to accurately check the speed.

HARRY: Wooo…flying time!

Scene III

(Setting: The next day in Windseekers Class.)

PROFESSOR HUGGDATREAZ: Good morning, class.

CLASS: Wind is moving air—energy is there.

PROFESSOR HUGGDATREAZ: It seemed to be pretty windy last night. Did you have fun using the anemometers to measure the wind speed?

BREEZUS: It was great, until I fell off my broomstick trying to get a reading.

CLASS: *(Laughs)*

BREEZUS: The edge of the cliff had sustained gusts up to 80 miles per hour. We'd get tons of energy from that!

HALLEY: Actually, that's too much wind. Gusts that high would shut the turbine down. They need to protect themselves from incredibly strong winds, so when the wind gets too powerful they shut down. Also, did you notice what direction the wind was blowing?

HARRY: The wind came right up the face of the cliff. I actually leaned out over the edge, holding my broom tight in case I fell, and the wind held me up! My cap blew off and flew up, up, up into the air.

PROFESSOR HUGGDATREAZ: This is actually another reason why the edge of a cliff will not work. Wind turbines are designed to capture air that is moving parallel to the ground. They cannot capture wind that is moving upwards.

CLOUDIA: The flat field where the gardens are got between 15 and 25 mile per hour winds the whole time we were there. Would it work?

RODNEY: But would we have to move all those plants? Some of them take years to bloom.

PROFESSOR HUGGDATREAZ: Many wind farms use the land under the towers for farming or grazing. We could continue to use the area around the turbine for plants. There is plenty of room for both.

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HARRY: I know from flying that the wind changes depending on the weather and the season.

PROFESSOR HUGGDATREAZ: Ten points to Cloudia for finding a good spot and a point to Harry for noticing that the wind isn't always constant. We only took measurements for one night, which really isn't sufficient for determining a good site, but since it was windy, it will give us a good idea of where to look.

HALLEY: Wind measurements should really be taken at a site for at least one full year to get an idea of what the wind is like at all times. Many people who are considering where to put a turbine will measure the wind speeds for three years or more!

BREEZUS: If wind isn't reliable, why use it?

PROFESSOR HUGGDATREAZ: A point for Halley. As she said, you really need long term data to determine if a site is a good one for a wind turbine. A team of our professors has just finished reviewing Hogwatt's many years worth of weather records and has determined that winds in the garden area are very reliable. The average wind speed is calculated to be 15 miles per hour. The wind doesn't blow over the garden all of the time, but it is predicted that the turbine will be generating some power for the school 80 percent of the time. What other benefits does this location have?

CLOUDIA: It isn't near the owls or any other normal bird route.

BREEZUS: There are no tall buildings or trees near it.

RODNEY: We probably won't even hear the sound from the turbines when we're inside mixing potions.

HALLEY: By using wind power, we are using a renewable energy source. We'll never run out of wind energy, and we're taking care of the environment.

PROFESSOR HUGGDATREAZ: I'm proud of all of you for putting the facts together and deciding on the same site the experts did. We know we will need reliable energy to meet the electrical needs of our growing population of students. For our next assignment…

(Lights go out.)

HARRY: I guess Professor Dieseldore was right. We need to use wind energy at Hogwatts.

CLASS: Wind is moving air—energy is there, and that's why we should care!

Harry Spotter and the Quest for the Right Light
Teacher Guide

★Concepts

- Compact fluorescent and LED bulbs are more energy efficient than incandescent bulbs.
- ENERGY STAR® qualified light bulbs and appliances are the most energy efficient you can purchase.
- Spending more to purchase an efficient product now will save more money in the long run on utility costs.

Vocabulary

- appliance
- antiques
- efficient
- emissions
- flummoxed
- humanitarian
- initially
- lumens
- pledge
- qualified
- quarrelling
- unique

☑Assessment

1. Draw a blueprint of your house, indicating the light bulbs in each room. Compute how much a household could save on their electric utility bill by switching to CFLs or LEDs. What impact would changing this many bulbs have on the environment? Go to www.energystar.gov for helpful information and resources.
2. Name ways to save energy mentioned in the play. *(Answers will vary, but may include: switching out old bulbs to CFLs or LEDs, turn down the thermostat, buy ENERGY STAR® appliances.*)
3. Write a letter to your household giving them suggestions on how they could reduce their electric and/or utility bills.
4. Draw a picture cause/effect chart showing what happens in Professor Dieseldore's office.

Extensions

- Conduct a survey of your school. Are there ways you could save energy? Write a proposal to your principal with your suggestions.
- If your class or energy club is participating in the ENERGY STAR® Pledge to Save Energy campaign, discuss how you will get your message out to your families and the community. Set a class goal for the number of pledges you want to collect. Write a script that you will use when you approach someone (a friend, relative, or neighbor) about signing the pledge. Practice the script with a classmate until you feel comfortable sharing what you have learned about energy efficient lighting.
- Continue the story. What do you think should be done with the additional money saved at Hogwatts?

Cast of Characters

- **Fluorenzo:** A prankster who loves to stir up trouble
- **Halley:** Extremely intelligent student, passionate about causes
- **Rodney:** Easily frustrated student, passionate about saving energy
- **Harry:** Student with a calming influence on his friends
- **Nevi:** A curious friend
- **Professor Dieseldore:** Headmaster
- **Friends:** Class or cast

Teacher Tip

- Stop your class after Scene II. Have the students predict what kind of deal Halley is planning.

Harry Spotter and the Quest for the Right Light

Characters

FLUORENZO: A prankster who loves to stir up trouble

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NEVI: A curious friend

PROFESSOR DIESELDORE: Headmaster

FRIENDS: Class or cast

Scene I – Hanging Out in the Potion Room

(Setting: Halley is sitting at a table with newspaper ads spread around her, reading, and occasionally circling items with a quill. Rodney sits nearby with his head in his hands. Fluorenzo, Nevi, and friends are mixing potions.)

FLUORENZO: Hey Halley, are you wishing on the stars all over that newspaper ad that your potion will mix itself?

HALLEY: It's the ENERGY STAR®. This mark indicates which household appliances are most energy efficient. And BTW, I mixed my potion yesterday!

FRIENDS: ENERGY STAR® light, ENERGY STAR® bright,
Energy efficiency is always right.
I wish I may, I wish I might,
Save energy and money with some STARs tonight!

(Harry enters the room. Rodney's head pops up.)

RODNEY: Harry! About time! Maybe you can talk some sense into her.

HARRY: What has she done now?

HALLEY: SHE is right here. And SHE is just doing the humanitarian thing. Of course, it takes a HUMAN to understand that.

RODNEY: Did…did…did she just say I wasn't HUMAN?

HARRY: What are you doing, Halley… *(he shuffles through newspapers)* looking at kitchen stuff?

NEVI: Hogwatts just received a big grant and Professor Dieseldore is asking students to submit proposals on how to spend the money. Halley and Rodney are quarrelling over how to spend it.

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FLUORENZO: Let's propose a new headmaster—(*chanting*) Dieseldore, is a bore, Dieseldore, is a bore.

FRIENDS: *(Giggle quietly in the background.)*

RODNEY: Harry, you know we need brighter lights on the Quiddich field. During the last match, the crowd didn't realize the game was over for fifteen minutes!

HALLEY: Although sports are entertaining, they aren't as important as the House Elves' working conditions.

NEVI: Here we go again…

HALLEY: During my chore time in the kitchens, I saw the appliances the House Elves use. They're antiques!

RODNEY: So let them sell the antiques for money to buy new ones!

HALLEY: *(giving Rodney a dirty look)* As I was saying, they have to run the dishes through the dishwasher twice after every meal, because the old dishwasher doesn't work. Do you know how many dirty plates there are after all the students eat? The washing machines only hold one robe at a time, and the refrigerators are ancient!

NEVI: But they can still do their jobs using the old appliances. We NEED those lights—our athletes can't perform in the dark!

HALLEY: You are all impossible! *(exits the room)*

HARRY: I'm flummoxed; they both sound like important causes.

RODNEY: Give me those advertisements, I need to look up how much new lighting will cost.

Harry Spotter and the Quest for the Right Light

Scene II – Lunch Time in the Dining Room

(Setting: Nevi, Rodney, Fluorenzo, Halley, and Harry are sitting at a table. Other friends are eating nearby.)

NEVI: Hey, Rodney, what did you find out about the new lights for the field?

RODNEY: Did you know there are different kinds of light bulbs?

FLUORENZO: Like red and blue?

HALLEY: I think he means incandescent, halogen, compact fluorescent, LED…

HARRY: Or maybe he's talking about the ENERGY STAR® qualified lighting from the newspaper ads.

FRIENDS: ENERGY STAR® light, ENERGY STAR® bright,
Energy efficiency is always right.
I wish I may, I wish I might,
Save energy and money with some STARs tonight!

RODNEY: The incandescent bulb, Thomas Edison's light bulb from 1879, is really inefficient. In an incandescent bulb, 90 percent of electric power is converted into heat, not light.

FLUORENZO: We don't want those for our field, it's too hot down there already!

HARRY: I'll bet you found a better option.

RODNEY: Compact fluorescent and LED bulbs are much more energy efficient, not making as much wasteful heat. ENERGY STAR® qualified bulbs use about 75 percent less energy than standard incandescent bulbs and last up to ten times longer. They produce about 75 percent less heat, too, so they're safer to operate and can cut energy costs associated with home cooling.

NEVI: Are compact fluorescents those funky looking spiral bulbs?

HALLEY: Yes, those are usually called bulbs for short. And there is nothing wrong with looking a little unique. LEDs are also unique, sometimes having many tiny bulbs inside.

FLUORENZO: *(quietly to the friends)* Halley knows all about looking unique.

FRIENDS: *(Giggle quietly in the background.)*

RODNEY: Actually, ENERGY STAR® qualified bulbs come in many shapes, sizes, and shades.

NEVI: Why isn't everyone using them if they save money?

RODNEY: You see an incandescent bulb is initially pretty cheap to buy, while a CFL or LED may be slightly more expensive. But, if you consider that ENERGY STAR® lights last longer and use less electricity to operate, over the life of an average bulb, you could save a lot of money in electricity costs!

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HARRY: You can SAVE money by SPENDING money?

NEVI: If you consider how many bulbs we have now…why that's A LOT OF MONEY saved!

RODNEY: I did some research online too. ENERGY STAR® has a website with information about energy efficient lighting. I even signed the Pledge to Save Energy.

HARRY: What's a pledge?

HALLEY: It's like a promise.

NEVI: What did you pledge to do?

RODNEY: To make a change today to save energy and protect the climate. I promised to change one light bulb in my house from an incandescent to an ENERGY STAR® qualified LED.

FLUORENZO: What kind of difference would that make?

RODNEY: Let me break it down for you guys. *(Hold up pictures or examples of an LED and an incandescent light bulb)*

RODNEY: I took out the old 60-watt incandescent bulb from my dorm room ceiling light and replaced it with an ENERGY STAR® qualified 12-watt LED. They both give off the same amount of light, or lumens, so I can't tell the difference when I'm doing my homework. This one change will save Hogwatts over $100 in energy costs over the life of the bulb. And, it saves more than 1,000 pounds of carbon dioxide emissions. An LED would cost slightly more but use even less energy, it would save us EVEN MORE money, and help the environment.

HARRY: You save money and you help the environment. Very cool.

HALLEY: Can we find more information on ENERGY STAR® qualified appliances on their website too?

RODNEY: Sure can! Go to www.energystar.gov. There's information on clothes washers, dishwashers, refrigerators, freezers, dehumidifiers, room air conditioners, and lots of other suggestions on how to save energy.

HALLEY: You know, Rodney, I'm thinking we can work out a deal on this proposal.

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Scene III – The Meeting in Professor Dieseldore's Office

(Setting: Rodney and Halley are sitting at his desk, the rest of the friends gather around the office.)

PROFESSOR DIESELDORE: I understand the two of you are submitting a joint proposal for the grant money.

RODNEY: We want to use the money to buy ENERGY STAR® qualified light bulbs for the playing fields, classrooms, and dorms.

PROFESSOR DIESELDORE: Those can be pretty expensive bulbs, Rodney.

RODNEY: We learned that they may cost more initially, but in the long run, Hogwatts will save on its electric bill.

FLUORENZO: We also want to share what we've learned with the community during Friday's half time show. There will be flying tricks and a band…

HARRY: We'll just give a short presentation about energy efficient lighting and appliances, and we'll have a booth where we can answer questions and collect Pledges to Save Energy.

NEVI: Every family at Hogwatts that changes their five most frequently used light bulbs to ENERGY STAR® qualified CFLs or LEDs can save energy costs every year.

PROFESSOR DIESELDORE: Saving money sounds like an excellent idea. But Halley, what about new appliances for the House Elves?

HALLEY: Our proposal is actually a two-part plan.

HARRY: With the new efficient lighting, Hogwatts will save lots of money on its utility bill.

PROFESSOR DIESELDORE: I'm guessing you have plans for that money?

HALLEY: We want to use our savings to buy ENERGY STAR® qualified appliances for the House Elves. While doing our research on ENERGY STAR®'s website, we learned that when buying an appliance, it has two price tags: what you pay to take it home and what you pay for the energy and water it uses. ENERGY STAR® qualified appliances incorporate advanced technologies that use 10–50 percent less energy and water than standard models. The money Hogwatts will save on our utility bills can more than make up for the cost of more expensive, but more efficient, ENERGY STAR® models.

PROFESSOR DIESELDORE: Sounds like a great proposal!

HARRY: But wait—there's more!

RODNEY: With the money we save using the energy efficient appliances, we want to buy everyone new winter robes. Then we can turn down the thermostat next winter.

HALLEY: And that will save Hogwatts even more money.

PROFESSOR DIESELDORE: OK, I'm convinced. You get your new lights, and your new appliances. This is the first time I've given away money and saved at the same time!

FRIENDS: ENERGY STAR® light, ENERGY STAR® bright,
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