Teacher's Guide to Third and Fourth Grade Reading and Writing Exercises for

The Magic School Bus and the Electric Field Trip

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This Guide Includes:

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    1. Life without Electricity
    2. The Blackout
    3. Stormy Letter

* the vocabulary list could be used as a student handout or made into a transparency

1. Language Arts Sunshine State Standards Connections Chart

Activity	Third Grade Standards	Fourth Grade Standards
Preview	LA 3.1.7.1, 3.3.1.1	LA.4.3.1.1
Reading Discussion and Review	LA 3.1.6.1, 3.1.6.2, 3.1.7.3, 3.1.7.4, 3.2.1.5, 3.2.2.2, 3.5.2.1	LA. 4.1.6.1, 4.1.6.2, 4.1.7.3, 4.1.7.4, 4.2.1.5, 4.2.2.2,
Worksheet 1: Vocabulary	3.1.6.1	4.1.6.1
Worksheet 2: Reading Comprehension	3.1.7.3, 3.2.2.2	4.1.7.3, 4.2.2.2
Worksheet 3: Sequencing	3.1.7.3	4.1.7.3
Writing 1: Life without Electricity*	3.2.1.5, 3.3.1.1, 3.3.1.3, 3.3.2.1, 3.3.2.2, 3.3.3.3, 3.3.5.1, 3.4.2.3	4.2.1.5, 4.3.1.1, 4.3.1.3, 4.3.2.1, 4.3.2.3, 4.3.3.3
Writing 2: The Blackout*	3.3.1.1, 3.3.1.2, 3.3.3.2, 3.4.2.1	4.3.1.1, 4.3.1.2, 4.3.3.2, 4.4.2.1
Writing 3: Stormy Letter*	3.3.1.1, 3.3.1.2, 3.3.3.1, 3.4.2.4	4.3.1.1, 4.3.1.2, 4.3.3.1, 4.3.2.4

*** Writing can be scored with an FCAT six point Rubric**

Consider introducing a sharing and editing component to the writing process and cover benchmarks relating to standard 3.4.3 or 4.3.4 as well!

2. Related PLT Activities

The activities listed below could be used to enhance "The Magic School Bus and the electric Field Trip" lesson. All PLT activities are connected to the Sunshine State Standards and can be found on the Florida PLT website at http://www.sfrc.ufl.edu/plt/correlations/index.html.

#14 Renewable or Not? (4th grade)
#39 Energy Sleuths
#73 Waste Watchers
And PLT's Energy and Society Kit™

3. Preview

Read the title. Show the students the various details of the cover including the light bulbs turning one another on, the outlet and the power tool, the light switch and the toaster and show how the school bus looks like a wall plug. Ask them where they think the students will be going on a field trip? What might they learn? What would they like to know more about?

A KWL chart may be useful in organizing the students' thoughts and ideas. This chart can be posted on the board or turned into individual/group worksheets.

Do a KWL Chart:

What they know	What they wonder	What they learned

4. Reading Discussion Questions

1. Where does the story begin? *In Ms. Frizzle's classroom. P.6*
2. What are the students of Ms. Frizzle's class going to learn about today? *Electricity P.6*
3. What were the different items that use electricity the students wrote on the board? *Lights, Computer, Bell, Fan, Clock, Tape Player, TV, VCR P.7.*
4. Who entered the classroom to visit the class? *Dottie Frizzle, Ms. Frizzle's niece. P.8*
5. Which tiny parts of the atom circle the nucleus? *Electrons P.9*
6. What is everything made of? *Atoms P.8 (Located in Sidebar)*
7. What happens when electrons leave atom and jump to the next atom? *They make a stream called an electric current. P.10*
8. What are some good paths for electricity? *Metals, Acids, Water P.11*
9. What are some good blockers of electricity? *Plastic, Rubber, Wood, Glass, Air P.11 You can have additional discussion about safety and electricity – why you should not use a hair dryer in the bathtub, why touching metal gives you a static electricity shock, etc.*
10. How did Ms. Frizzle and her students make electric current in the classroom? *They created a mini-power plant by moving a magnet near a wire. P.12*
11. What happened in the classroom after the lightning and thunder cracked outside? *The lights went out, it was a blackout. P.13*
12. What caused the school blackout? *Lightning had hit a tree and knocked it down; the fallen tree had broken a power line. No power, no electricity, no lights. P.14*
13. What is causes lightning? *When electrons stick to drops of water or ice during a storm, and when enough of them gather together they jump, creating lightning. P.14*

14. How can you stay safe when there is lightning outside? *Go into a house or car, do not use the telephone, do not use electric appliances, do not go near water. P.14 Why? Because water conducts electricity; the rubber tires on a car do not.*
15. Where can we put power lines that won't be damaged by wind or storms? *Underground. P.16*
16. Where is the class headed on the school bus? *The town's power plant. P.17*
17. How do some power plants make electricity? *Some power plants use heat to make electricity, they burn fuels like coal, oil or natural gas to make heat. P.18*
18. What is one bad thing caused by fossil fuel-burning power plants? *Air pollution from burning fuels. Most fossil-fuel power plants have scrubbers that reduce emissions, but all fossil-fuel power plants put carbon dioxide into the air that changes the climate. P.18*
19. What happened to the class when they got to the power plant? *The school bus turned into a dump truck and dumped them into the furnace with a bunch of coal. P.18*
20. What are the 5 cleaner ways to make energy? *Solar generators, geothermal plants, hydroelectric plants, windmills and tidal plants. P.19 (Located in Sidebar) These sources of energy are not fossil fuels and do not involve burning carbon.*
21. Why don't we use a cleaner way to make all our electricity? *Right now we can't get all the electricity we need from these sources. P.19 (Located in Sidebar) Technology is changing, but we do not have the capacity to produce all we need at this moment from renewable sources. We could reduce what we need = conservation.*
22. How does this power plant work? What is the first step? *Burn fuels to heat water and create steam. P.20*
23. Once the water is heated and becomes steam, what happens? *The steam turns a turbine. P.22*
24. What is attached to the turbine that creates the electricity? *A generator is attached to the other end of the turbine; the turbine spins the magnet to create electric current. P.24*
25. Does the power plant use magnets to create electricity? *Yes, almost all power plants use magnets to make large amounts of electricity. P.24*
26. When the class was in the power line what was moving all around them? *Electrons. P.26*
27. What did they pass through that made the voltage change? *A transformer. P.27*
28. Where was the first place they stopped after the power plant? What did they learn about? *They stopped at the library and learned how an electric light bulb works. P.28*
29. When they visited the diner, what appliance were they in? How did it work? *They were in a toaster and they learned how a heating element works when electricity passes through it. P.30*
30. What is one thing that turns inside of a motor? *The rotor or magnets that are not attached to the stator. P.34*
31. At Phoebe's grandma's house which animal knocked down the bird cage? What was used to clean up the mess? Who used the vacuum? *The cat. The vacuum. Phoebe's Grandpa used the vacuum. P.36*

32. Where were Ms. Frizzle and her class trapped? *They were trapped in the vacuum cleaner. P.38*
33. How does a switch work? *A switch works by separating contacts to stop the flow of electrons. When the contacts are together the switch is on and electrons can move, when the switch is off the contacts are separated and the electrons have no where to go. P.38 (Located in Sidebar)*
34. What was Phoebe's Grandpa doing? Why couldn't he hear them? *He was watching TV. P.39*
35. What is shot at the back of a TV screen to create a picture? *Electrons. P.39*
36. Why did Phoebe's Grandpa turn the vacuum on again? *Phoebe's puppy tracked dirt inside the house P.40*
37. When the class got back to the school how did they get out of the wires? *The wire of the floor waxing machine was frayed and so they jumped out of the wire. P.42*
38. What did Ms. Frizzle tell the custodian Mr. Johnson? *She told him he needed to repair the frayed wire or he might be shocked. P.43*

Review

If a KWL chart was used in the beginning of this lesson, return to the KWL chart to identify misconceptions, confirm correct beliefs, and identify questions for further research.

If students recorded information on a worksheet you can have them do this independently or in groups.

5. Word Morphology

tidal energy – energy from ocean tides
tidal – (relating to the ocean tides)

solar energy – energy from sun light
solar – (relating to the sun)

geothermal energy – energy from inside the earth
geo - (earth) *thermal* – (relating to heat)

hydroelectric energy – energy from falling water
hydro - (relating to water)

Vocabulary Words

Atom – small particle that makes up all matter

Blackout – when electric current stops flowing from the power plant to the community

Conductors – something that current runs through easily

Current – the flow of electrons that causes electricity

Electricity – traveling electrons

Electromagnet – wire is wrapped around piece of metal, when current runs through the wire it creates a magnet.

Electrons – particles that circle around the center of an atom

Element – makes heat when electricity runs through it, like in a toaster

Filament – small thin piece of tungsten metal in a light bulb that glows when electricity passes through it

Frayed – when something is torn or broken, such as the insulation on an electric wire

Furnace or boiler – a chamber where heat is created by burning a fuel

Generator – creates electricity by turning a magnet coiled by wire

Insulator – something difficult for current to run through

Lightning – when electrons gather on tiny drops of water or ice and then jump to the ground or another group of gathered electrons

Magnet – object that has a field that exerts a force on another object

Motor – electromagnets make the rotor or the moving parts spin

Nucleus – the center of an atom

Phosphor – a chemical that glows with light when hit with electrons

Steam – a gas that is made of very hot invisible water molecules

Switch – used to turn on and off electric appliances by moving the contacts together or apart

Transformer – a machine used to raise or lower the voltage of electric current

Turbine – fan blades are pushed by steam to spin a shaft that can turn an object, such as a generator

Volts – is a measure of push of electric current

The Electric Field Trip

Vocabulary Words

Atom

Blackout

Conductors

Current

Electricity

Electromagnet

Electrons

Element

Filament

Frayed

Furnace Or Boiler

Generator

Insulators

Lightning

Magnet

Motor

Nucleus

Phosphor

Steam

Switch

Transformer

Turbine

Volts

The Electric Field Trip

Worksheet 1 - Vocabulary

First name_____

Last name_____

Directions: Use the vocabulary words from the word bank to complete the sentences.

Word Bank		
electrons	transformer	current
frayed	filament	conductors
heat	insulators	steam
	blackout	

1. Atoms are made of _____ and a nucleus.

2. Power plants use_____ to make electricity.

3. Electrons jumping from atom to atom create electric _____.

4. When electric current passes through a _____ its voltage is changed.

5. Electric current does not travel through _____ very easily.

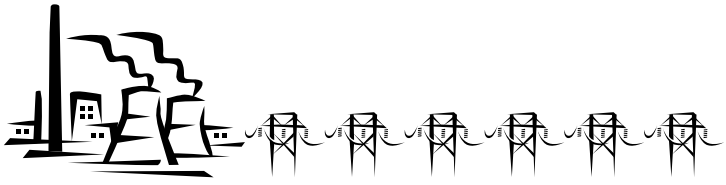
6. Electric current can travel easily through _____.

7. A _____ is when electric current stops flowing from the power plant to the community.

8. In a coal burning power plant _____ turns the turbine.

9. Inside a light bulb a _____ glows to create light.

10. A _____ wire is torn or broken so that the metal wire is showing.



The Electric Field Trip

ANSWER KEY

Worksheet 1 - Vocabulary

Directions: Use the vocabulary words from the word bank to complete the sentences.

Word Bank		
electrons	transformer	current
frayed	filament	conductors
heat	insulators	steam
	blackout	

1. Atoms are made of ____electrons_____ and a nucleus.

2. Power plants use_____heat_____ to make electricity.

3. Electrons jumping from atom to atom create electric __current_____.

4. When electric current passes through a _____transformer_____ its voltage is changed.

5. Electric current does not travel through __insulators_____ very easily.

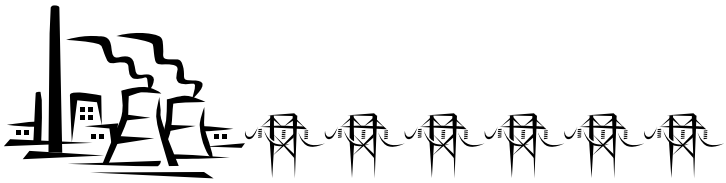
6. Electric current can travel easily through ____conductors_____.

7. A __blackout_____ is when electric current stops flowing from the power plant to the community.

8. In a coal burning power plant _____steam_____ turns the turbine.

9. Inside a light bulb a _____filament_____ glows to create light.

10. A ___frayed_____ wire is torn or broken so that the metal wire is showing.



The Electric Field Trip

First name_____
Worksheet 2 - Reading Comprehension Last name_____

Directions: Circle the correct answer

1. What did Ms. Frizzle's class learn about?

    a. the magic school bus
    b. electricity
    c. fuel-burning power plants
    d. both b. and c. are correct

2. Which of the following did the class need to create electricity?

    a. a magnet
    b. a light bulb
    c. a meter to measure current
    d. all of the above

3. What did the steam turn inside the power plant?

    a. the turbine
    b. the generator
    c. the steam pipe
    d. the boiler

4. What was the first thing they saw inside the power plant?

    a. the boiler
    b. the turbine
    c. the generator
    d. the steam pipe

5. What type of power plant did the class visit?

    a. nuclear power plant
    b. fuel-burning power plant
    c. hydroelectric power plant
    d. solar power plant

The Electric Field Trip — ANSWER KEY

Worksheet 2 - Reading Comprehension

Directions: Circle the correct answer

1. What did Ms. Frizzle's class learn about?

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    a. nuclear power plant
    b. fuel-burning power plant
    c. hydroelectric power plant
    d. solar power plant

The Electric Field Trip

Worksheet 3 - Sequencing

First name_____

Last name_____

Directions: Put each of the following sets of events in the correct sequence as they occurred in the story.

A.

____ The power went out in the classroom.

____ The class learned how a motor works.

____ Lightning and thunder cracked outside.

____ The class learned how a light bulb works.

____ The class arrived at the power plant.

B.

____ The class entered the steam pipe.

____ The class entered the high-voltage wire.

____ The class entered the boiler.

____ The class entered the turbine.

____ The class entered the generator.

The Electric Field Trip

ANSWER KEY

Worksheet 3 - Sequencing

Directions: Put each of the following sets of events in the correct sequence as they occurred in the story.

A.

__2__ The power went out in the classroom.

__5__ The class learned how a motor works.

__1__Lightning and thunder cracked outside.

__4__ The class learned how a light bulb works.

__3__ The class arrived at the power plant.

B.

__2__ The class entered the steam pipe.

__5__ The class entered the high-voltage wire.

__1__ The class entered the boiler.

__3__ The class entered the turbine.

__4__ The class entered the generator.

The Electric Field Trip

Writing 1 – Life without electricity

First name_____
Last name_____

Plan your Writing:

We use electricity to do everything from cook and take hot showers, to talk on the phone and watch television. Ms. Frizzle's class learns about many other things that use electricity. Imagine what life would be like without electricity. How would your life be different? To plan, think of three ways you use electricity every day and complete the chart below.

Way you use electricity	Why is it important to you?	How would your life change with out it?	What could you do instead?

Writing Prompt:

Use the ideas from your chart to write to explain what life would be like without electricity. Write a paragraph about each of the three things you listed. Each paragraph should have a topic sentence and be supported by details.

The Electric Field Trip

Writing 2 – The Blackout

First name_____
Last name_____

In the book “The Magic School Bus and the Electric Field Trip”, Ms. Frizzle’s class experienced a black out. Imagine you are babysitting when the power goes out. Write to explain what you say to the children you were watching. Provide at least two examples of what may have caused the blackout.

The Electric Field Trip

Writing 3 – Stormy Letter

First name_____
Last name_____

Hi,

How are you? I am doing well! I really enjoyed your last letter. I get so excited when I see an envelope from you has arrived!

You mentioned your class was learning about lightning and electricity. That sounds very interesting. My class is learning about fractions, ugh! Anyway, it has been very stormy here and it makes me scared. Do you know what lightning is? How can I stay safe in a storm? Thanks for your help. I hope to be able to visit you soon.

Sincerely,
David

Writing Prompt

Imagine you just received this letter from your friend. Use what you learned from "The Magic School Bus and the Electric Field Trip" to write a letter back answering his questions about lightning and storms.