Edible Schoolyard NYC Garden Curriculum

Third Grade

Descriptive Word Hunt (September)*: Students find objects in the garden that match descriptive words.

Fossil Fuels (October)*: Students will do a demo to show how fossil fuels are created. Students will read narratives about the impacts of fossil fuels on communities.

Simple Machines (October): Students use simple machines in the garden to understand how the invention of simple machines increased efficiency in agriculture.

Climate Change (November)*: Students play a game to simulate how climate change affects plants and animals in a forest ecosystem.

Fracking (December): Students read a short story about how fossil fuels are extracted from the ground and its effect on nearby plants, animals, and people.

Trash Masters (January)*: Students discuss the environmental impacts of our garbage, and play a game to understand ways to reduce garbage.

Food Web (February)*: Students study the concept of a food web and re-enact a food web based on the garden.

Sensory Poetry (February)*: Students read some example poems and write their own poetry, using their sensory observations from the garden.

Seed Dispersal (March)*: Study adaptation and dispersal and create “seeds” that can disperse under different conditions.

The Bee Lesson (April)*: Students learn about the importance of bees and how they are being threatened by human activity.

Pests in the Garden (May)*: Students play a game to study the impacts of pesticide use on local ecosystems.

Three Sisters (June)*: Students read the Native American legend of the Three Sisters and plant a Three Sisters bed.

* Part of current scope & sequence at Edible Schoolyard NYC at P.S. 216

Descriptive Words Scavenger Hunt

Aim
Students will use their senses and their vocabularies to find objects in the garden.

Summary
Students will walk through the garden using a "descriptive words" scavenger hunt, looking for and drawing objects in the garden that match the descriptive words.

Standards
CCSS: ELA, Grade 3, RF 4c: Use context to confirm or self correct word recognition.

Materials

- Clipboards and pencils
- Worksheets: "Our Garden Is…"
- Exit ticket (Slip of paper with the prompt: "OUR GARDEN IS…List as many words as you can to describe the things in our garden.")
- Tasting

Vocabulary

- sensory
- fragrant
- odorless
- multicolored
- descriptive
- smooth
- rough
- edible
- inedible

Procedure: Day One
Opening Circle (2 minutes)

- *Welcome, everyone, back to the garden. Today we are going to do a scavenger hunt, which will require your knowledge of the garden and very*

Adapted from ESY Berkley, http://edibleschoolyard.org/berkeley/

sharp observation skills.

Inquiry Activity One (20 minutes)

- Hand students clipboards with "Our Garden Is…" worksheets and pencils.
- *You are going to go through the garden and look for things to draw that match the descriptive words on this paper.*
- Go over the describing words and make sure students understand them.
- Model how to fill out the worksheet. For example, you could show them a fragrant flower and show them where you would draw that on your worksheet.

Inquiry Activity Two (20 minutes)

- Bring the students back to the circle to share their answers.
- Show them the part of the worksheet that says, "What other words would you use to describe our garden?"
- Give students a few minutes to brainstorm some answers.
- Share answers.
- *Now go back into the garden and look for things that match your own descriptive words.*

Closing Circle (8 minutes)

- Bring students back to the circle and collect their work.
- Distribute exit tickets and pencils. "OUR GARDEN IS….List as many words as you can to describe the things in our garden."
- Collect exit tickets.

Procedure: Day Two

Opening Circle (5 minutes)

- Review descriptive words from the day before.
- Encourage students to keep their senses alert for things that are fragrant, multicolored, etc., as they do their garden job.

Garden Activity (35 minutes)

- Explain the garden jobs of the day, and go out into the garden.

Closing Circle (10 minutes)

- Recap garden jobs. *Thank you, students, for helping our garden today!*
- Taste something from the garden (cherry tomatoes, basil, ground cherries, etc.). Have students share their impressions of the tasting, using descriptive words.

Adapted from ESY Berkley, http://edibleschoolyard.org/berkeley/

Common Core State Standard Extension

CCSS ELA Grade 3 W 3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

- Have students write a paragraph about the garden using as many of the descriptive words as possible: edible, inedible, rough, smooth, fragrant, odorless, multicolored.

Name: _____

Our Garden Is…

Fragrant *Has a smell*	**Odorless** *Has NO smell*	**Multi-colored** *MANY colors*	**One color**

Smooth	Rough	Edible *Able to eat*	Inedible *NOT able to eat*

What other words would you use to describe our garden?

Fossil Fuels and Our Garden

Aim
Students will understand what fossil fuels are and what their impact is on the environment.

Summary
Students will do a demo to show how fossil fuels are created. Students will read narratives about the impacts of fossil fuels on communities.

Standards
CCSS. ELA. RI.3.2: Determine the main idea of a text; recount the key details and explain how they support the main idea.

NYS: Science, LE 7.1: Identify ways in which humans have changed their environment and the effects of those changes.

NYS: Science, LE 7.1a: Humans depend on their natural and constructed environment.

NYS: Science, LE 7.1c: Humans as individuals or communities change environments in ways that can be either helpful or harmful to themselves and other organisms.

NYS: Science, 4.1b: Explain how people's wants exceed their limited resources and that this condition defines scarcity

Materials

- Dry erase board and markers
- A bucket with a piece of charcoal at the bottom, hidden under a layer of soil
- Additional soil and organic material to add to your bucket during demo
- Fossil fuel narratives
- Pollution visuals
- Storybook pages
- Seasonal tasting

Vocabulary

- natural

Adapted from Teacher's College, Farm to Table and Beyond, "Natural Resources," p. 296; Food, Land and People, Don't Use it All Up!; Food, Land and People, Go Go H20!

- resources
- fossil fuels
- fossil
- coal
- gasoline
- natural gas

Procedure: Day One

Opening Circle (10 minutes)

- *Who can remind me of the things that plants need in order to survive and grow?*
- *What are some of the things that all animals, including you, need to grow and thrive?*
- *These things that we all depend on are called "natural resources*." Write this on the board.
- *The word "resource" means a supply of something that we can use when we need it.* Write the definition on board.
- *Sunlight, water, air, and soil are some natural resources. Can you think of other resources that you use? What are the things we need in order to meet our basic needs of food, shelter and water?* Generate a list on the board.
- If necessary, ask leading questions:
    - *What are some of the resources we use to build our homes?*
    - *What are some of the resources we use to keep our homes warm and light?*
    - *What are some of the resources we use to grow our food?*

Inquiry Activity One (20 minutes)

- *Today we're talking about one of these resources: fossil fuels. These are what we use to power large electrical machines. What are some examples of large machines that might use fossil fuels?*
- *Today we are asking the question: where do fossil fuels come from? We're going to do a little demonstration – a little fossil fuel magic trick.*
- *Let's start with this question: what are fossils? A fossil is a creature from long ago, pressed down and preserved in rock and mud. Fossil fuels are made from these creatures over millions of years.*
- Take the bucket in which you have hidden a piece of charcoal under a layer of soil. Put some organic material (grasses, seashells, bugs) into the bucket. *Let's say this is the bottom of a lake, 300 million years ago. There are plants and seashells and little creatures.*
- Put a scoop of dirt on the top of the organic matter. *But then time passes, and the lake dries up. Dirt falls on top of the organic matter. As millions of*

years pass by, more and more dirt and soil and rock piles up on top of the plants and shells and creatures. Have students take turns adding dirt to the bucket.

- *Imagine that this is a mountain of soil over our organic matter! It's not just a few inches down, but thousands of feet into the ground. All that dirt is pressing and pushing on the organic matter. Now, we have to speed up time.*
- Have students turn their arms to mimic the passing of time. *Okay, millions of years are passing! The dinosaurs are being born. Then the dinosaurs are going extinct. The first birds are being born. The first little mammals are being born, like mice and squirrels. Then the first large mammals, like elephants and whales. Then the first people are being born!*
- *Here's the magic trick. What happened after all those millions of years?* Reveal the charcoal.
- *This is not just how coal is made, but also petroleum and natural gas.* Write these three fossil fuel names on the board.
- *Do you think it is easy to make fossil fuels? No, because it takes millions and millions of years! Do you think it is easy to get fossil fuels out of the ground, thousands of feet down? That's not easy either!*

Garden Job (10 minutes)

- *Nature makes the fossil fuels that we use for electricity, for transportation, and for cooking. If nature didn't do this, what are some of the things that we wouldn't have or couldn't use?*
- *Let's say thanks to our environment for providing us with energy. Let's do some work to take care of our garden.*
- Lead students in a brief, seasonal garden job.

Closing Circle (5 minutes)

- Have students remind you of the way that fossil fuels are made.
- *Next time, we're going to learn about some of the things that happen when fossil fuels are used.*

Procedure: Day Two

Opening Circle (5 minutes)

- *Last time we were talking about natural resources, especially about fossil fuels. How are fossil fuels made? What do we use them for?* Write student ideas on the board.
- *So, we all know that fossil fuels are a source of energy that we use for electricity, for cooking, for transportation. Today, we're going to read a*

story about what happens to plants, animals, and people when fossil fuels are used.

Inquiry Activity One (15 minutes)

- Pass out copies of the story or stories to be read. Stories can be read by students on their own, or it can be read aloud. After you read, ask students:
  - *What happens in the story?*
  - *How are the fossil fuels being used?*
  - *How are the plants, animals, or people in the story affected by the fossil fuels?*
- Share student responses.
- *This is a tricky problem. We need fossil fuels to power our cars, our homes, and our buildings, but they can be bad for our health and for the environment.*
- Share visuals of pollution. Have students talk with a partner about what they see. *What is it making in the air when the fossil fuels are burned? Where are the fossil fuels coming from? What surprised you about these pictures?*

Inquiry Activity Two (20 minutes)

- *You are all experts now about fossil fuels. We're going to make a book that tells the story that we read before.*
- Show students an example of the page they will be illustrating. Explain that each of them will be responsible for one page of the story. Encourage students to add additional text and to illustrate their step of the story.

Closing Circle (5 minutes)

- *We can't totally avoid using fossil fuels. But we can try to use less of them.* If you have time, take student ideas about how to use fewer fossil fuels. Especially focus on how growing plants can clean the air.
- Share a seasonal tasting. *I didn't use any fossil fuels to make this tasting from our garden. Did I use a truck to drive it here? Did it come from a factory?*

Common Core State Standard Extensions

CCSS ELA W.3.1: Write opinion pieces on topics or texts, supporting a point of view with reasons.

- Have students write a letter to the president about rules they would like to see for fossil fuel use, citing examples from their class readings.

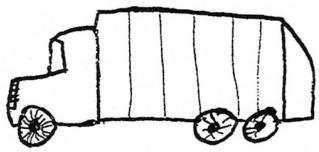
Adapted from Teacher's College, Farm to Table and Beyond, "Natural Resources," p. 296; Food, Land and People, Don't Use it All Up!; Food, Land and People, Go Go H20!

Many things that we use are made in factories. Some of these things are toys, clothes, books, and furniture. The machines in the factories use fossil fuels. The smoke from the used fossil fuels comes out of a smoke stack and goes into the air.

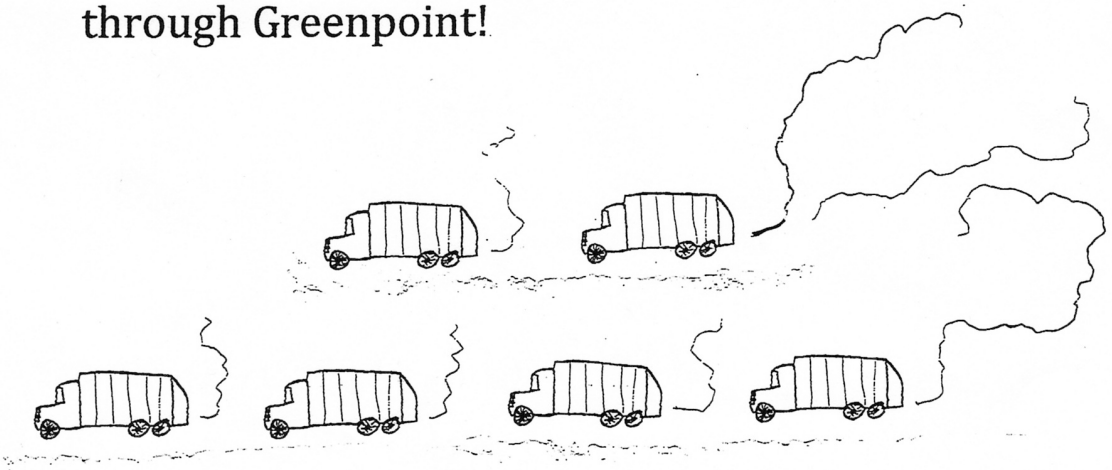
Sometimes, the smoke in the air from the factories can mix with rain. This rain is called acid rain. Acid rain doesn't hurt people, but it can hurt plants. The acid rain can fall on leaves and damage them so that they fall off. If the plant loses its leaves, then it can't absorb the sunlight and it can't grow.

Scientists are studying the effects of acid rain on forests. They think that acid rain is making forests grow more slowly.

What happens to our trash? Trucks bring our trash to garbage dumps in New York City.

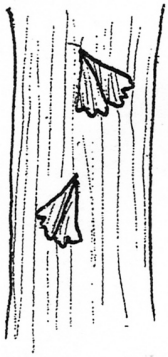


The neighborhood of Greenpoint, in Brooklyn, has a lot of garbage dumps. Trucks bring almost half of the city's garbage to Greenpoint. That's 2,500 trucks that come through Greenpoint!

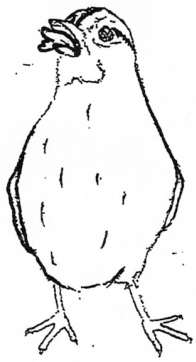


People who live in Greenpoint are upset that there are so many trucks in their neighborhood. When the trucks burn gasoline, they make the air dirty. Now some people in Greenpoint have a cough or can't breathe.

In England, there is a kind of moth called the peppered moth. It is spotted black and white, like pepper. This color helps it to blend into the trees in the forest and to hide from birds.



When fossil fuels first started being used in London, the smoke stained the trees. Instead of being gray, the trees became black. The peppered moths that were light in color could no longer hide on the trees. The birds ate the light colored moths.



Now only the dark colored moths can survive. There are far fewer of the peppered moths now. Only about half of them have survived.

A factory is a big building where things are made.

Factories burn fossil fuels. The smoke goes into the air.

The smoke from the factories mixes with the clouds.

The dirty rain falls on the trees.

The trees lose their leaves.

Simple Machines

Aim
Students explore how simple machines changed the history of agriculture and still help us out today.

Summary
Students try garden activities with and without the help of simple machines to learn about how and why simple machines make work easier.

Standards
NYS: Social Studies, 2.1c: "Study about different world cultures and civilizations focusing on accomplishments, contributions, values, beliefs, and traditions."

NYS: Science, PS 5.1f: "Demonstrate how mechanical energy may cause changes in motion through the application of force or the use of simple machines."

NYS: Science, S1.1: "Ask 'why' questions in attempts to seek greater understanding concerning objects and events they have observed and heard about."

Materials

- Dry erase/chalkboard and markers
- Wheelbarrows/wagons
- 2 small buckets of soil
- 2 large buckets of soil
- Sticks
- Pitchforks
- Images of wheel development, printed and laminated separately
- Tasting

Vocabulary

- simple machine
- plough
- cultivator
- lever
- wheelbarrow
- work

Adapted from *Life Lab's* "How Things Work," p. 151.

Procedure: Day One

Opening Circle (10 minutes)

- *I have a challenge for you guys. Let's say we had to move all of these hay bales from here to the other side of the garden. How would we do it? Keep in mind that we can't bring a car, truck or other motorized vehicle in here, so that's not an option. Turn to the person sitting next to you and come up with some sort of a plan.*
- After a few minutes, get their attention back to you. Ask for volunteers to share their ideas. Point out the ones that involve simple machines.
- Point to "simple machine" written on the white board, and ask the students for a definition. Definition: "A machine without moving parts, for example: level, wheel and axle, pulley, screw, wedge, inclined plane."
- *Many of the tools in the garden can also count as simple machines. Who can give me some examples of simple machines we use in the garden?*
- *Simple machines help us do our work more easily. In this case, when we say "work" we mean "the use of force to move an object."*
- As you explain the concept of work, write the definition on the board or refer to it already written there. Ask for a student to give an example of using force to move an object.

Inquiry Activity One (25 minutes)

- Divide your class into two groups. Each group will be doing a different activity to explore simple machines. On the second day, they will switch.

Inquiry Activity One, Option A

- One activity will begin in a cleared area, with the buckets of soil nearby.
- Have students make two lines for teams. *One of you* (indicate which) *will be carrying this small bucket of soil by hand, and one of you* (indicate which) *will be carrying this small bucket of soil in the wagon or wheelbarrow.*
- Model the course they will need to cover.
- Before they begin, ask students: *Who will finish first? Who will have an easier time with their work? C*all on a few students to share their predictions.
- Have the two volunteers carefully race to see who can complete the course first. In this case, the volunteer carrying the bucket by hand will likely be the fastest.
- Repeat a few more rounds of this version of the race, switching participants each time, so more students get to participate.
- Now, get two new volunteers to carry the large buckets of soil. Have students make a new prediction about who will be fastest and who will have the easier time.
- Repeat a few more rounds of this race, switching participants each time.
- Ask students to describe what is happening. *Why can the person with the wagon carry such a large load? What simple machine is at work here?*

Adapted from *Life Lab's* "How Things Work," p. 151.

The wheel! The wheel was invented in ancient Mesopotamia over 5500 years ago.

- Put students in pairs. Give each pair a set of card with the stage of the development of the wheel. Have them place the cards in order from oldest wheels to most recent ones together. As they work, have them discuss with each other.
- *Which invention do you think came first? Which do you think came next? Hint: each new invention makes the work easier. How would the work get easier from one stage of the wheel to the next?* Have the pairs share out.

Inquiry Activity One, Option B

- The other activity will be a typical garden job of turning compost or cultivating the soil. This may be the first time that your students are using large tools. *Now that you are third graders, you have the opportunity to use large tools, like pitchforks and shovels. What are some ways that we can be safe when using these tools?*
- Go over tool safety.
- Explain that we will be using two tools today: sticks and pitchforks. (Alternately, students can use hands instead of sticks.) All students will get a chance to try both. Before they begin, have the students predict who will have an easier time doing this work and why. *Who do you think will have an easier time doing this work? The group who is using sticks or the group using the cultivating forks?*
- Ask for a volunteer to demonstrate using the pitchfork to cultivate the bed. Reinforce: tools are held low, and never pointed towards anyone; push the tool end into the soil with the bottom of your foot, rather than stabbing forcefully; spread out when working with large tools.
- Spend some time working, and then ask students to give feedback about their tools. Have students observe the two different types of tools and their differences.
- Time allowing, upgrade to a longer handled pitchfork so the students can compare that as well.
- *What is it about the fork that makes this work so much easier? In Ancient Egypt, farmers used digging sticks much like these. Then, someone in Mesopotamia was smart enough to invent a tool with a longer handle. By giving the digging tool a longer handle, these early farmers created a lever.*
- *A lever is a simple machine.* Demonstrate how a lever works much like a see-saw.
- Continue working on the garden job, giving all students a chance to try sticks and pitchforks, and compare differences.

Closing Circle (10 minutes)

- *What simple tools did you use or see being used in the garden today? How did these tools help you do your work?*

Adapted from *Life Lab's* "How Things Work," p. 151.

- *Can you think of a simple tool you use every day? How about a simple tool you used before you got to school today (wheel on the school bus, knife to put butter on your toast, etc). If it weren't for these smart inventions, we would have a much harder time growing food to eat.*

Procedure: Day Two

Opening Circle (10 minutes)

- *Who can remind me of the definition of work we learned yesterday? Work is the use of force to move an object.* Write it on the board, or point to it.
- *What did we use yesterday to help us do our work?*
- *When we do our garden jobs, we are usually moving some object, either, pushing, pulling, or lifting.*

Inquiry Activity (30 minutes)

- Have students switch activities so they try the one they did not try the day before.

Closing Circle (10 minutes)

- *What work did you do in the garden today? What simple machines did you use to help you do your work?*
- *What are some other ideas about other simple tools that could make our garden work even easier? Think like inventors – be creative!*
- Share a seasonal tasting.

Common Core State Standard Extensions

CCSS.3.W2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

- Students write a paragraph comparing/contrasting doing a garden job with and without the simple machines.

Adapted from *Life Lab's* "How Things Work," p. 151.

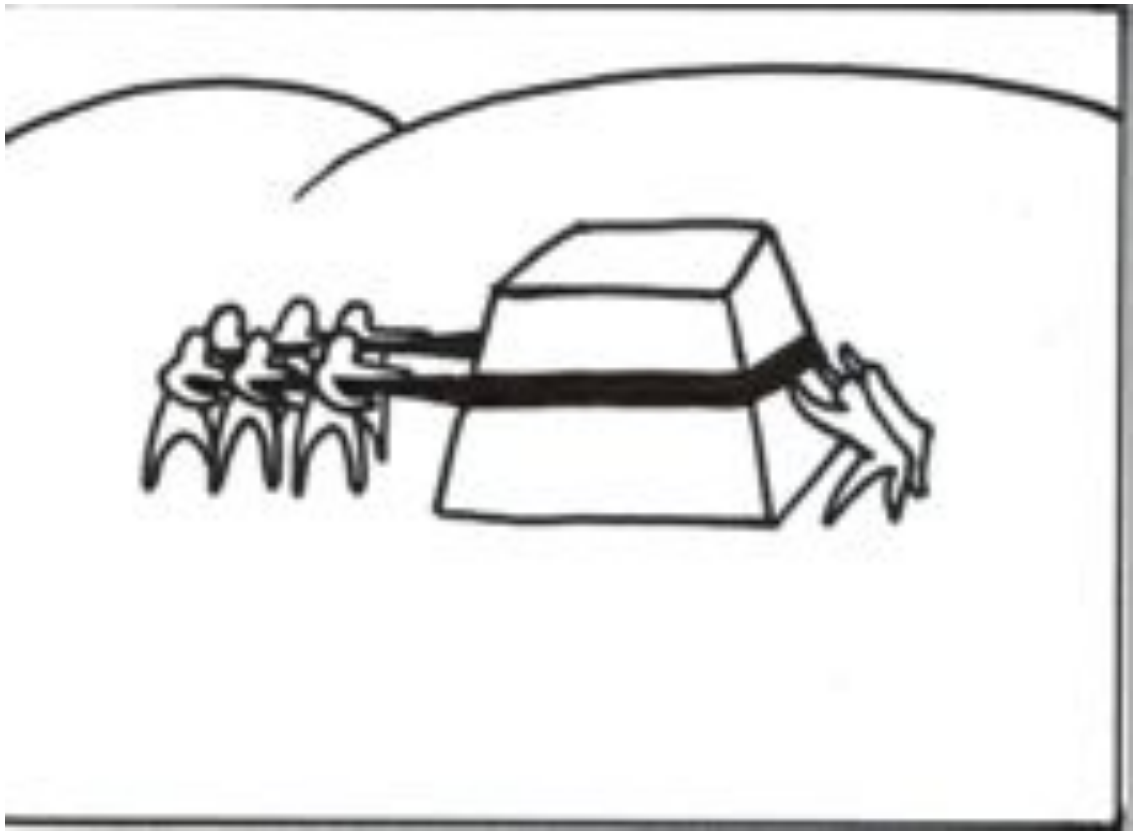
Other Extensions

Students can write narratives from the point of view of Egyptians at the time of the invention of the wheel. They can write what work was like before and after the wheel was invented.

Students can be ancient Egyptian ad executives and write/draw/act out an ad for the invention of the wheel or whatever gardening tool they used.

Research how simple machines used in the garden/farms have changed throughout time and why they think the changes came about.

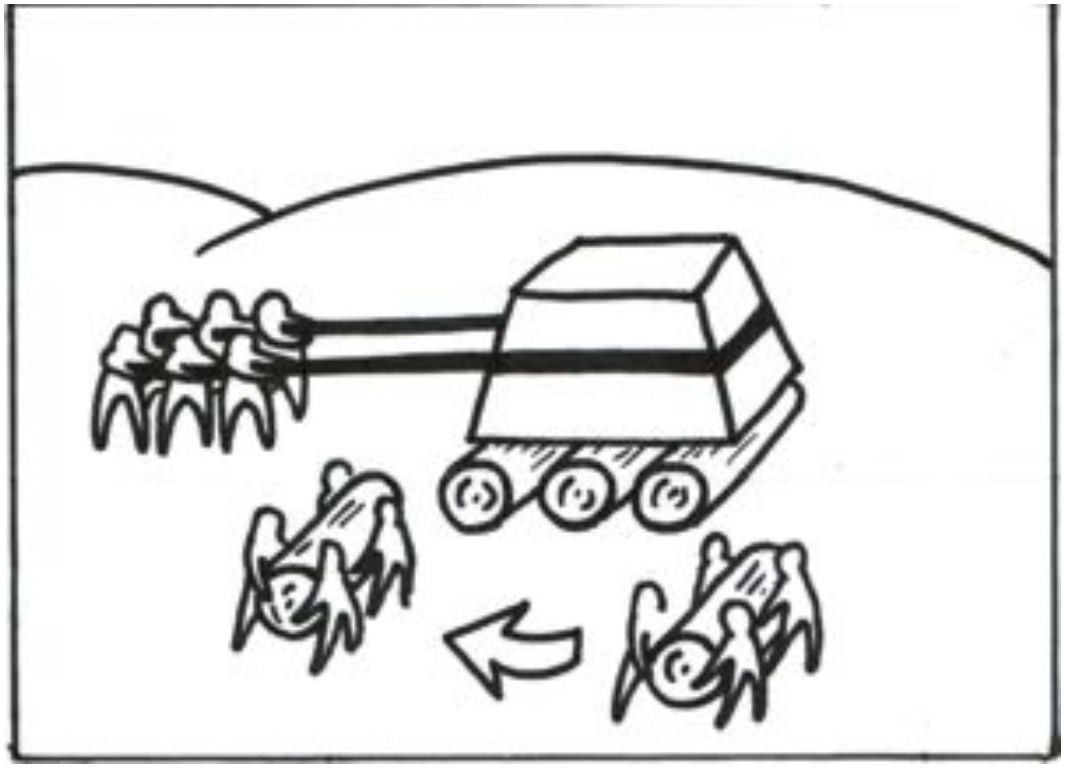
Adapted from *Life Lab's,* "How Things Work," p. 151.

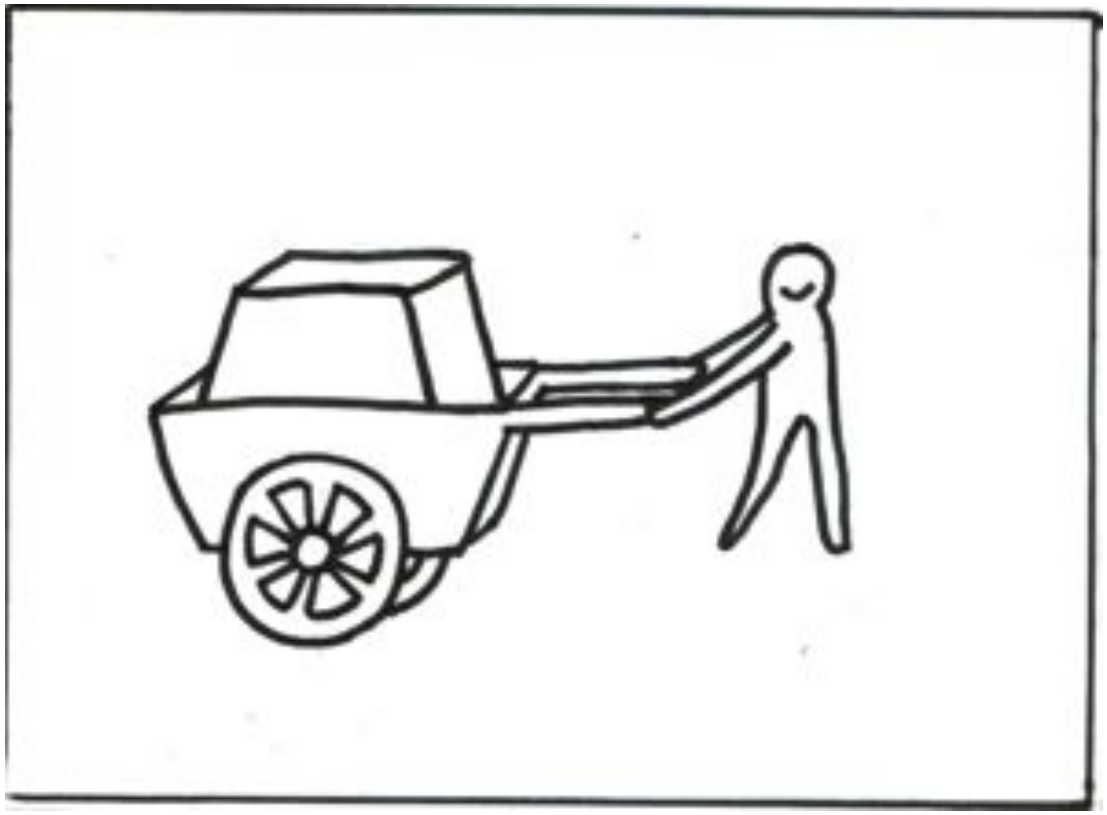


Wheel Images 1, 2 & 3

Adapted from *Life Lab's,* "How Things Work," p. 151.

Wheel Development Cards 1, 2 & 3





Adapted from *Life Lab's,* "How Things Work," p. 151.

Climate Change

Aim
Students will play a game to demonstrate how climate change affects animals and their environment.

Summary
How does the burning of fossil fuels affect our planet's climate? How does climate change affect plants and animals?

Standards
CCSS.ELA-LITERACY.SL.3.1
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly.

NYS: Science, LE 7.1: Identify ways in which humans have changed their environment and the effects of those changes.

NYS: Science, LE 7.1a: Humans depend on their natural and constructed environment.

NYS: Science, LE 7.1c: Humans as individuals or communities change environments in ways that can be either helpful or harmful to themselves and other organisms.

NYS: Science, 4.1b: Explain how people's wants exceed their limited resources and that this condition defines scarcity

Materials
- Dry erase board and markers
- Ecosystem visuals
- Resource Scavenger Hunt Worksheets
- Resource Scavenger Hunt signs
- Clipboards and pencils
- Seasonal tasting

Vocabulary
- weather

- climate
- pollution
- carbon dioxide

Procedure: Day One

Opening Circle (5 minutes)

- *Welcome back to garden class. The last time we were together, we talked about fossil fuels. What are fossil fuels? What do we use them for? Where are fossil fuels made? What do they produce when they are burned?*
- *We already talked about how fossil fuels make pollution when they are burned, and how that can hurt plants and animals. Today we are going to study a different impact that pollution has on our planet.*

Inquiry Activity One (10 minutes)

- Ask students to give you examples of how fossil fuels are burned: for electricity, for cooking, for transportation. *We already know that this makes pollution, but it also produces a particular gas called carbon dioxide.* Write the word "carbon dioxide" on the board.
- *Carbon dioxide is a normal part of air, and a normal part of our environment. In fact, carbon dioxide is the part of air that plants need to live. But by burning fossil fuels, there is too much carbon dioxide in the atmosphere now.*
- *Before we started using fossil fuels, there were 280 parts per million of carbon dioxide in the atmosphere.* Write this number on the board. *Today, there are almost 400 parts per million of carbon dioxide. That's a big increase!*
- *When we have more carbon dioxide in the air, it changes the earth's climate. Let's see if we can figure out what climate is.*
- Pass out ecosystem visuals. *These places have two different climates. Talk with your partner and determine what the climate might be like in these two different places.*
- Share back student responses, and write up the qualities of each ecosystem. *Climate is the pattern of weather over time in a certain place. All the extra carbon dioxide in our environment is changing the climate in places like these. Maybe the desert will get even less rain, or will get even hotter.*
- Solicit student ideas about ways that the climate could change. Use the forest, rainforest, desert, or other ecosystems as examples. Write ideas up on the board. Ideas should include: too much rain, not enough rain, temperature hotter or colder, seasons shorter or longer.
- *These are some good ideas. We're going to play a game to see what might happen.*

Inquiry Activity Two (20 minutes)

- *We're going to play a game in which all of you are members of a family of squirrels living in the forest. What do you think you need to live?*
- Pass out clipboards with Resource Scavenger Hunt sheets. *You are going to imagine that our garden is the forest, and you are preparing for the winter. You have to find food for the winter. You will have two minutes to walk around the garden and find signs in the garden. Each sign will have a source of food.* Show an example of a sign. Show them where on their paper they should fill out what they find.
- Remind students that they must walk during this scavenger hunt. Remind them that as soon as the bell is rung, they must stop writing and must come back immediately.
- Play one round of the scavenger hunt. Have students report back how many items they found. Tell students that if they found a certain number of resources, they have survived the winter; make the number of resources low enough so that most or all of the students survive.
- *Now we're going to do another round. Another year has passed, but there was not as much rain in the forest because of climate change. How do you think this has affected the squirrel's food? You might have a harder time finding resources in the forest this time around.*
- Have a helper remove several of the resource signs. Repeat the round as before. Students will most likely go to find resources that were there the previous round, but they will not be there. Have students return after two minutes.
- *What happened when you went out to find your food resources? What had happened to them? Were you able to find as many? Do you think the same thing might happen in nature?* Remind the students of the number they needed to find in order to survive the winter. *Did all of the squirrels survive this winter?*
- If you have additional time, you can play a third round with a different scenario. For example, there can be an additional scenario in which there was a fire and even more food resources were destroyed. Or, have a scenario in which the winter was extra long, so they needed to find even more resources to survive the whole time.
- If you are doing this lesson indoors, you can still set up signs within the classroom. Do a shorter period of time with fewer signs.

Closing Circle (10 minutes)

- Summarize what happened during the game. *How did the changes in climate affect the animals? Are there other ways that it could have affected them? Could it have affected their water or shelter, too?*
- *Climate change is a real thing that's happening around the world. How do you think climate change might affect people?* Have students turn to a partner and brainstorm ideas about how climate change might affect people.

- *Scientists around the world are trying to solve the problems caused by climate change. Policitians are trying to get people and businesses to change their behavior so they can reduce the burning of fossil fuels and stop climate change from happening. What is something that you could do to use fewer fossil fuels?*

Procedure: Day Two

Opening Circle (10 minutes)

- Remind students about what they discussed last time. *Burning fossil fuels puts more carbon dioxide into the air, which causes the climate to change. What are some of the ways that the climate could change? How could it affect plants, animals, or people? What is something that we can do to reduce our use of fossil fuels and help stop climate change?*
- Draw a plant on the board. *Plants do something amazing. They take carbon dioxide out of the air and turn it into oxygen, which is the part of the air that we need to breathe.* Draw an arrow, labeled as "carbon dioxide," going into the plant, and an arrow, labeled as "oxygen," coming out. *Do you think growing plants could help stop climate change?*
- *Growing more plants is not the only thing that we need to do to stop climate change. We also need to stop using so many fossil fuels in the first place. But we can definitely help by growing plants.*

Garden Job (25 minutes)

- Lead a seasonal garden job.

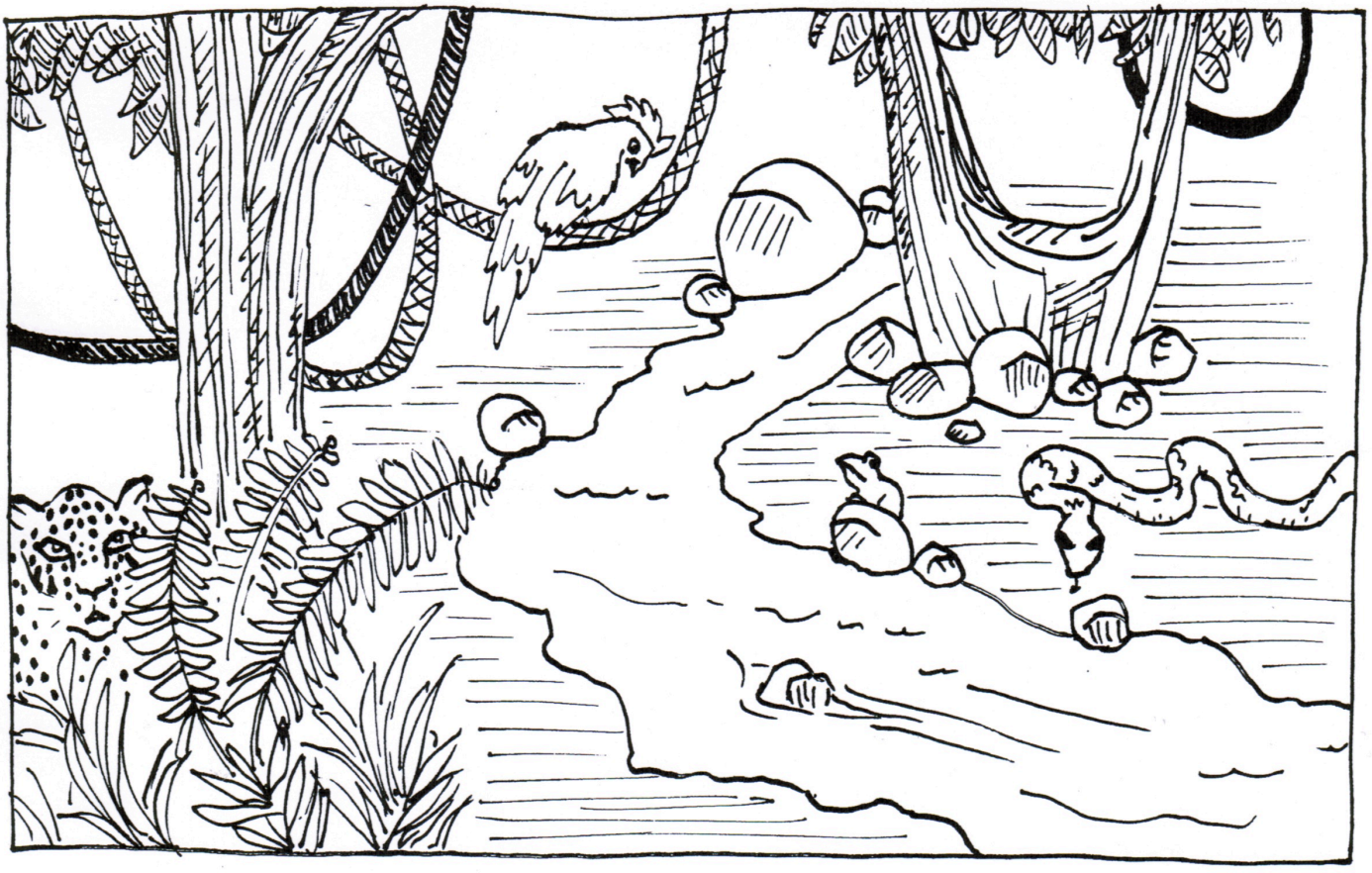
Closing Circle (5 minutes)

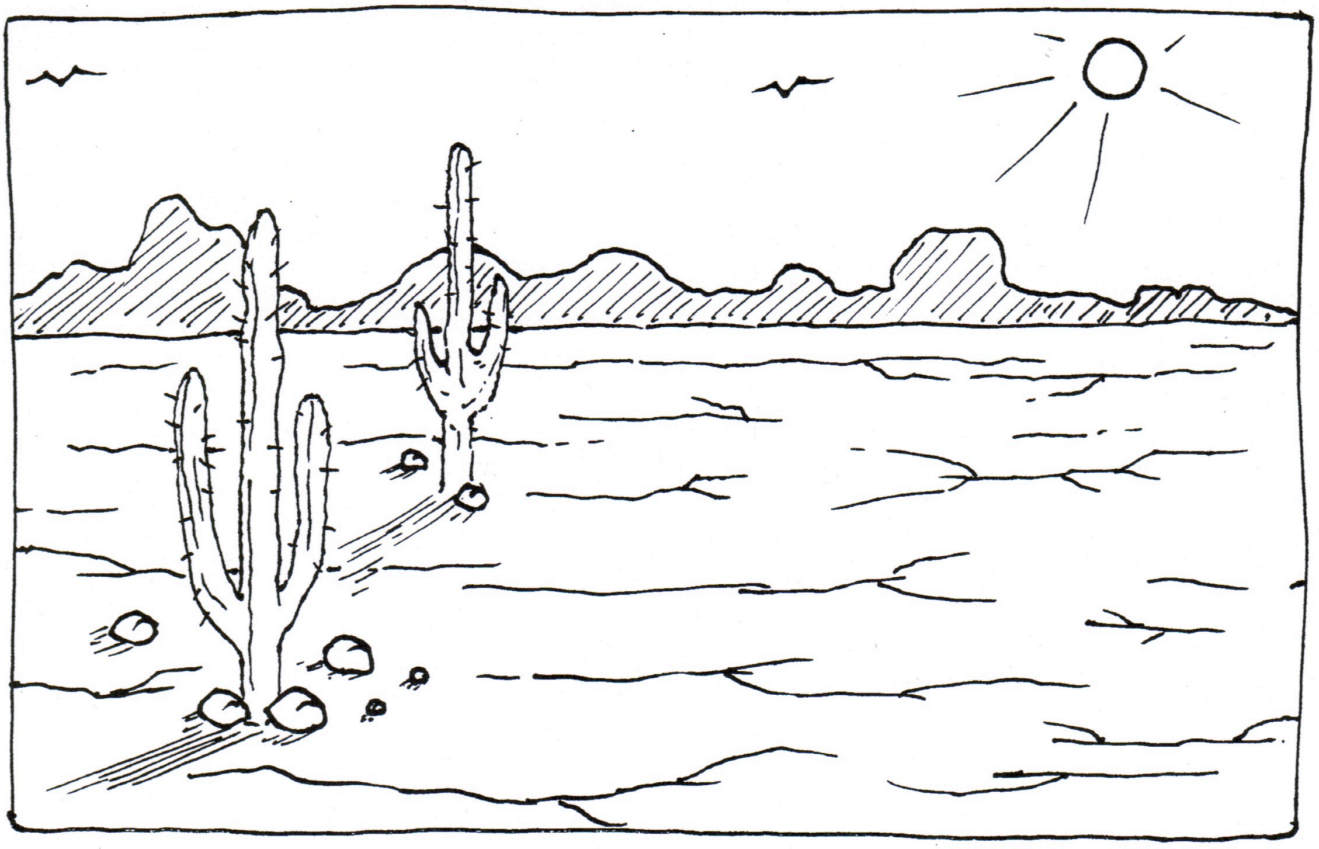
- *How do our plants in the garden help stop climate change?*
- Share a seasonal tasting.

Common Core State Standard Extensions

CCSS ELA W.3.1: Write opinion pieces on texts or topics, supporting a point of view with reasons.

- Have students write a letter to the editor describing the problem of climate change. They should explain the causes of climate change, give examples of the impact of climate change, and come up with some ways humans can slow the advance of climate change.





NAME: _____

FIND YOUR WINTER FOOD!

ROUND ONE

You are a squirrel looking for food in the forest. Look for signs with a food source on them. Write the names of the food that you find on the lines below.

_____ _____

_____ _____

_____ _____

ROUND TWO

You are a squirrel looking for food in the forest. Look for signs with a food source on them. Write the names of the food that you find on the lines below. Be careful – some of the food from the previous year might not be there any more!

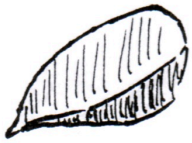
_____ _____

_____ _____

_____ _____

You found a walnut!

You found a beechnut!



You found a
hickory nut!

You found a
hazelnut!

You found a mushroom!

You found an acorn!

Fracking

Aim
Students will understand how the overuse of fossil fuels affects living things and how they can reduce their fossil fuel usage.

Summary
Students will read a narrative about the environmental and health effects of fracking, and will identify ways that they can personally reduce their fossil fuel use.

Standards
CCSS: ELA, Grade 3, RI3: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

NYS: Science, LE 7.1: Identify ways in which humans have changed their environment and the effects of those changes.

NYS: Science, LE 7.1a: Humans depend on their natural and constructed environment.

NYS: Science, LE 7.1c: Humans as individuals or communities change environments in ways that can be either helpful or harmful to themselves and other organisms.

NYS: Science, 4.1b: Explain how people's wants exceed their limited resources and that this condition defines scarcity.

Materials
- Dry erase board and markers
- Fracking comic book
- Gallon jug
- Pencils
- Crayons
- Post-Its or pledge papers and tape
- Globe poster (optional)
- Seasonal tasting

Vocabulary

- fossil fuel
- natural gas
- hydrofracking/fracking

Procedure: Day One

Opening Circle (5 minutes)

- *Welcome back to garden class. We've been talking a lot about fossil fuels in garden class. What are fossil fuels? What do we use them for? Where are fossil fuels made?*
- *Today, we are studying one of the techniques that is used to get natural gas out from under the ground.*

Inquiry Activity One (20 minutes)

- *We're going to take a journey deep inside the earth to see one of the ways natural gas is taken out from deep in the earth. This is called "fracking." It comes from the word "fracture." What does "fracture" mean? It means to break. The process breaks rock underground in order to take out the natural gas.*
- Pass out fracking comic books. Have students read independently, or read one page at a time and discuss together. You can use an actual gallon jug to help represent the visual on page 2 of the comic book.
- *How do they get out the natural gas? What resources do they use to get out the natural gas? How does the process of taking out the natural gas affect the environment and the people nearby?*
- After reading the comic book, have students turn and talk to a neighbor. *How would you feel if you lived next to one of the natural gas wells?*

Inquiry Activity Two (15 minutes)

- *We've been talking a lot in garden class about how fossil fuels affect plants, animals, people, and the environment when they are burned. What are some of the problems that are caused by burning fossil fuels?*
- *It turns out that people all over the world are talking about fossil fuels, too. Scientists, politicians, and ordinary people are worried about the burning of fossil fuels and how it affects plants, animals, people, and the environment.*
- *Just recently, the president of China, President Xi, and President Obama of the United States got together to talk about fossil fuels. China and the United States are the two countries that burn the most fossil fuels. They both agreed that they are going to reduce the burning of fossil fuels in their countries, so our world can be a cleaner, healthier place! How can we be a part of doing this?*

- On the board, identify things in our lives that use fossil fuels: lights, electronics, cars, buses, appliances, etc. *How can we reduce our use of fossil fuels? What are some things we can do instead of using fossil fuels?*
- Draw a globe on the board, or make a poster of a globe. Pass out Post-Its or paper to students. *We're all going to do our part. Let's all write down one thing we promise to do to use fewer fossil fuels and to make our world a cleaner, healthier place.* Student can decorate their pledges and post them up on the board or poster.

Closing Circle (5 minutes)

- Have students share their answers.
- *Thank you, gardeners, for pledging to reduce your use of fossil fuels and for helping to make the world a better place!*
- Share a seasonal tasting.

Common Core State Standard Extensions

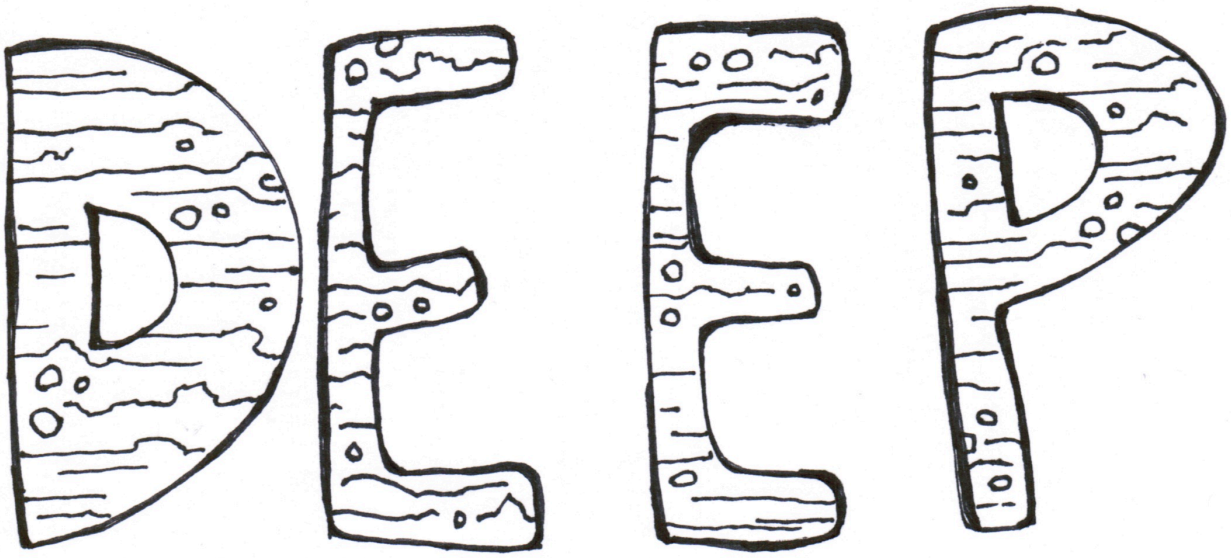
ELA, Grade 3, W2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

- Have students create posters to teach others about how to reduce fossil fuel use. Be sure that students expain in their posters why using too many fossil fuels is dangerous for the environment.

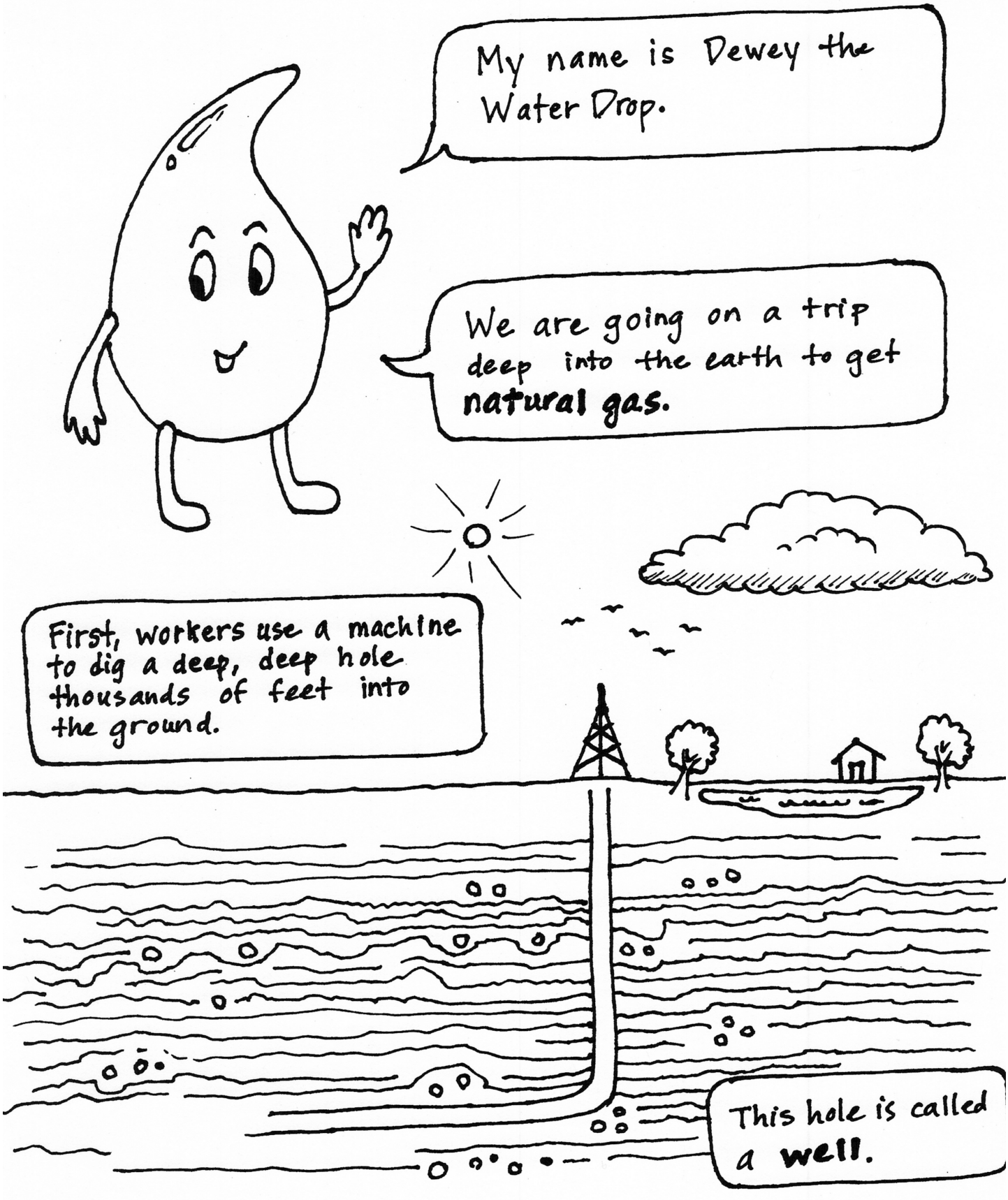
Other Extensions

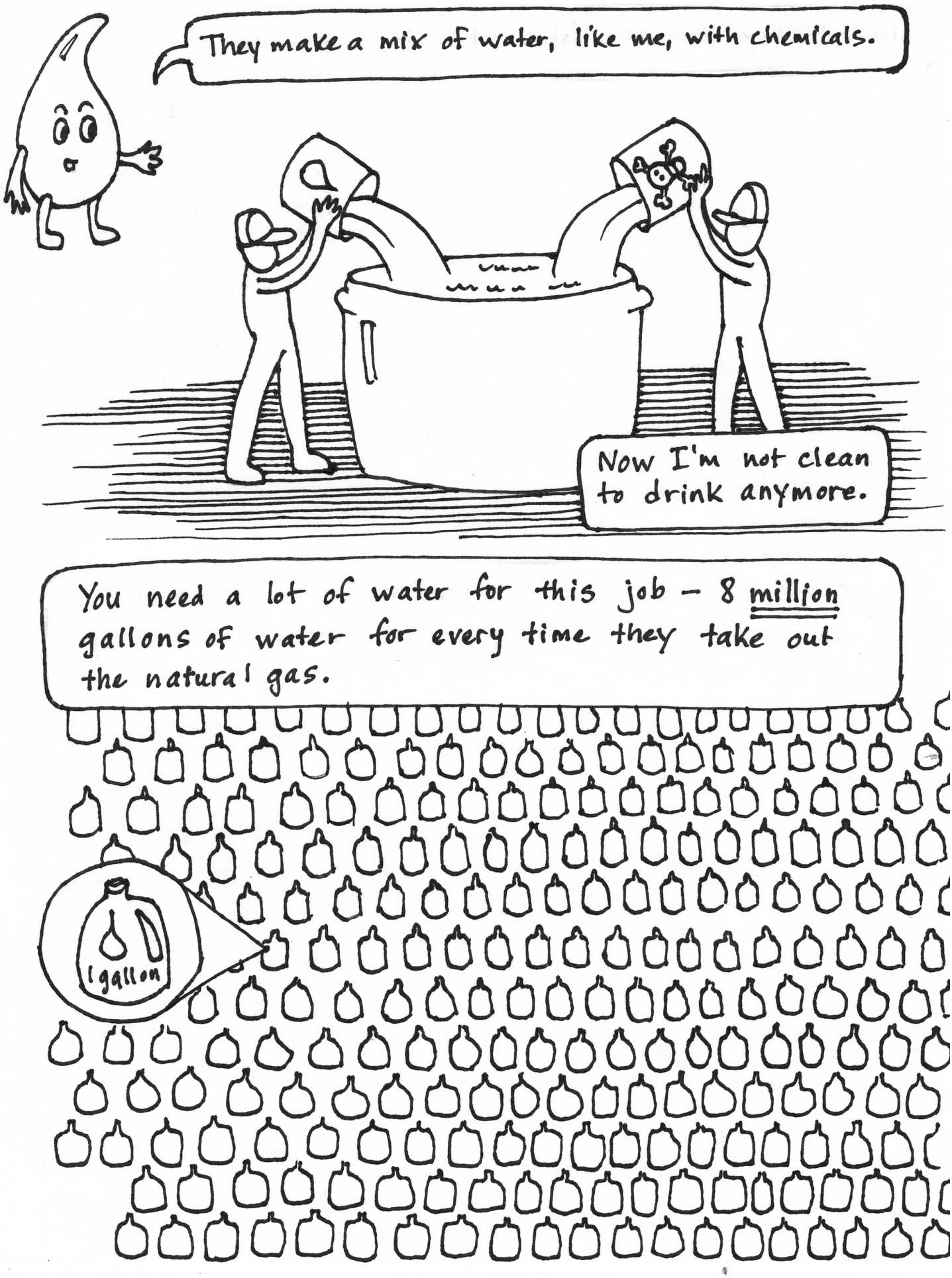
Math: Have students calculate how much electricity they could save if they turned off certain appliances for an hour. How much electricity could they save by not using an iPod, a lightbulb, or a television?

LET'S GO

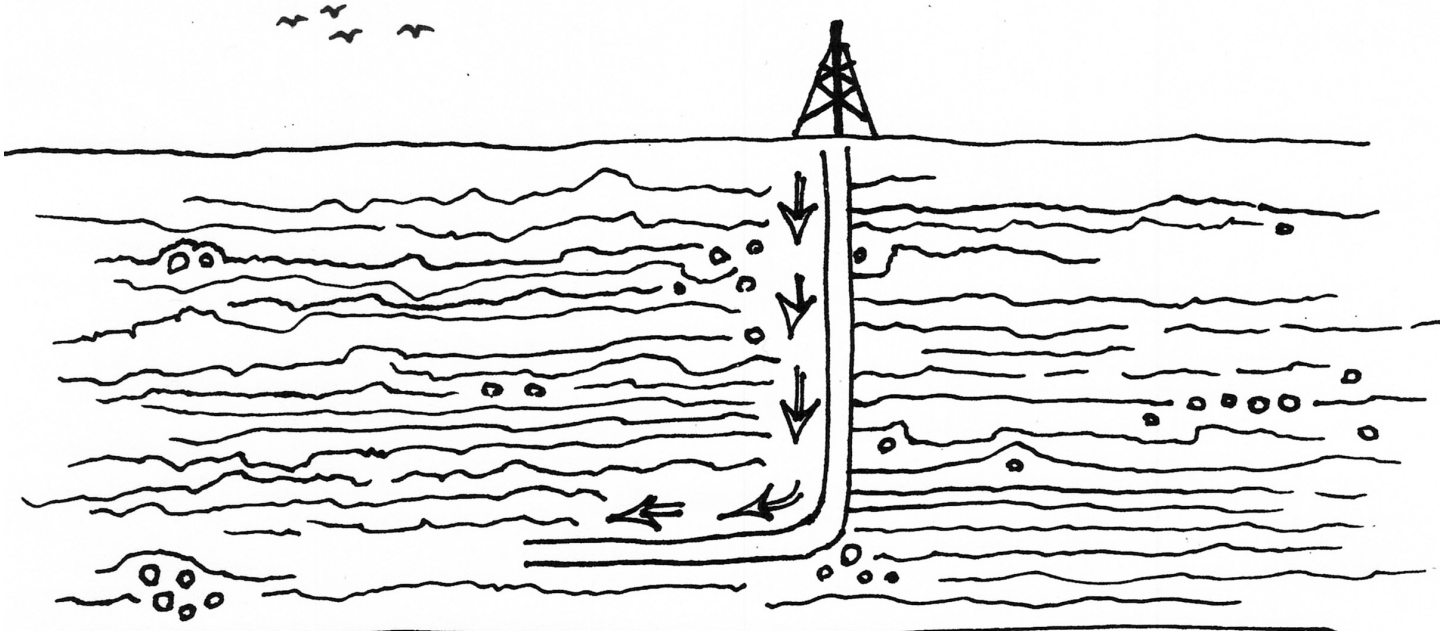


INTO THE

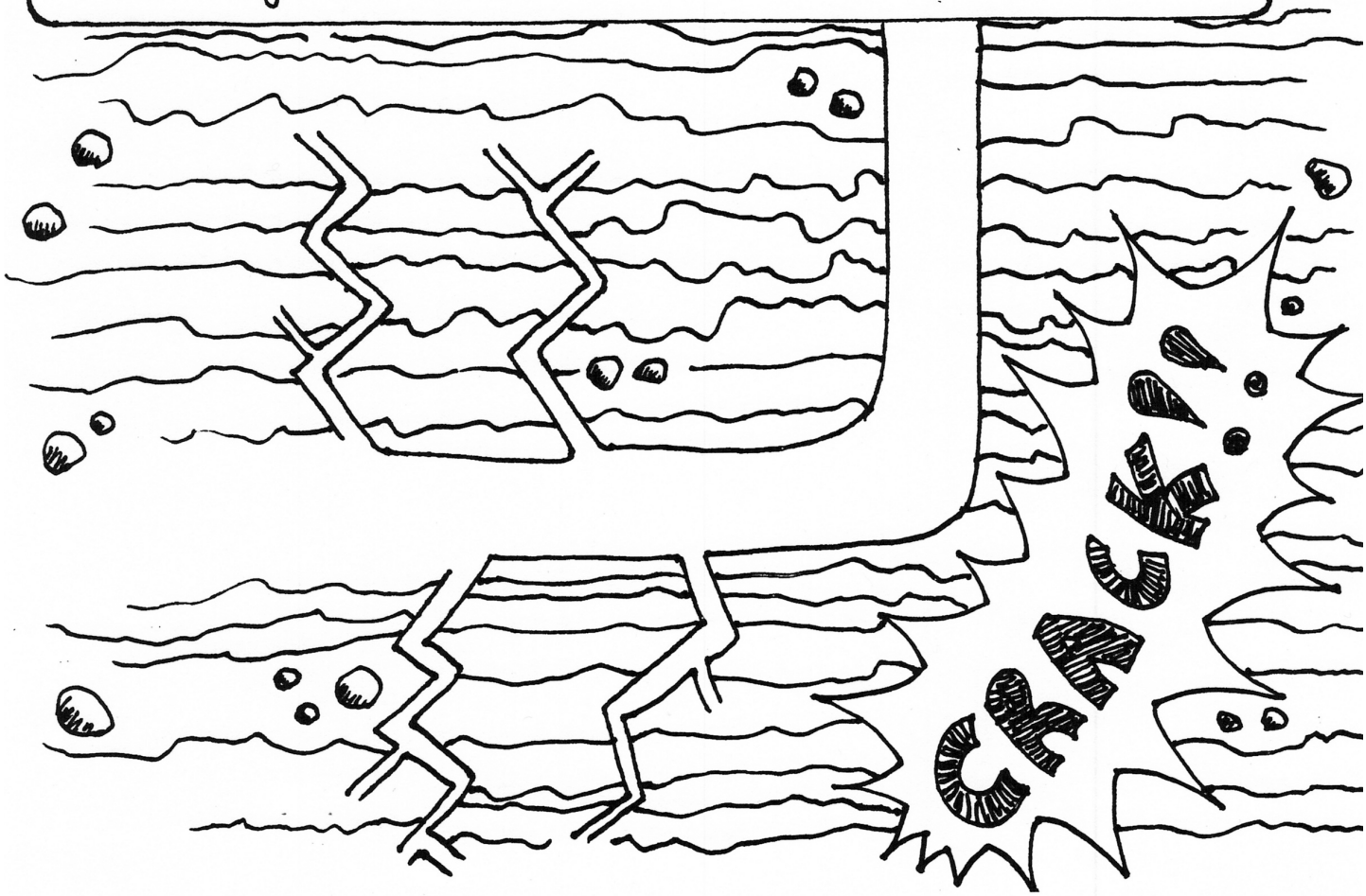

My name is Dewey the Water Drop.
We are going on a trip deep into the earth to get **natural gas.**
First, workers use a machine to dig a deep, deep hole thousands of feet into the ground.
This hole is called a **well.**

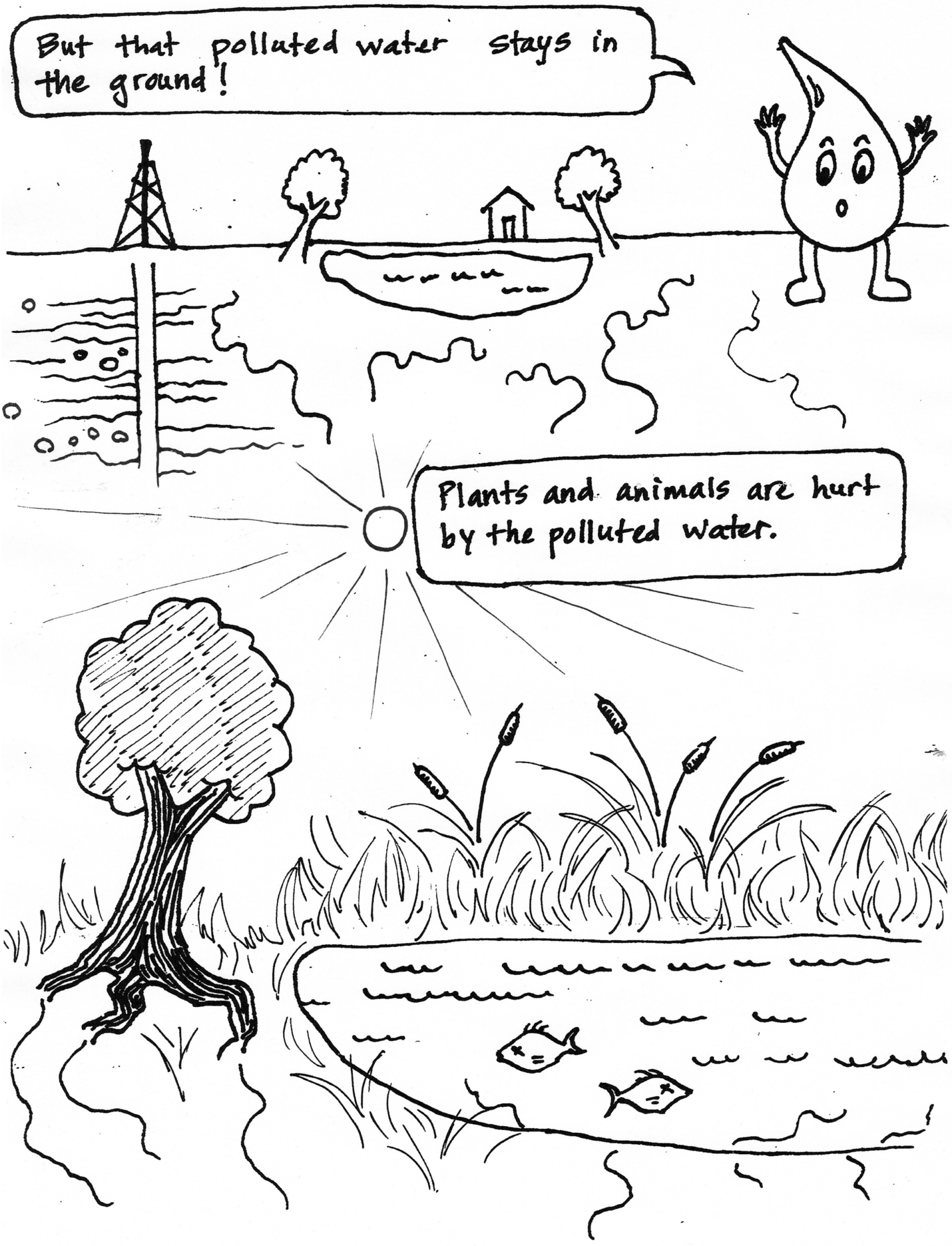

They make a mix of water, like me, with chemicals.
Now I'm not clean to drink anymore.
You need a lot of water for this job – 8 million gallons of water for every time they take out the natural gas.
1 gallon

Next, they push all that water and all those chemicals into the well at a very fast speed.

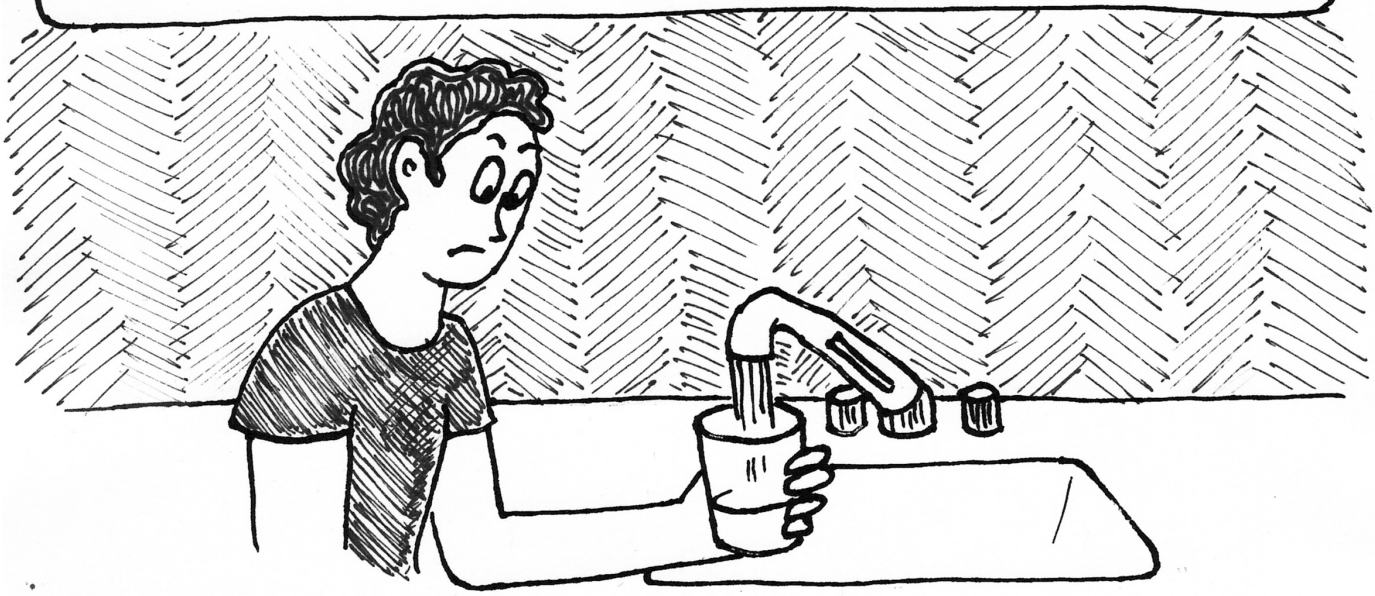


This causes the rock to crack and release the natural gas.

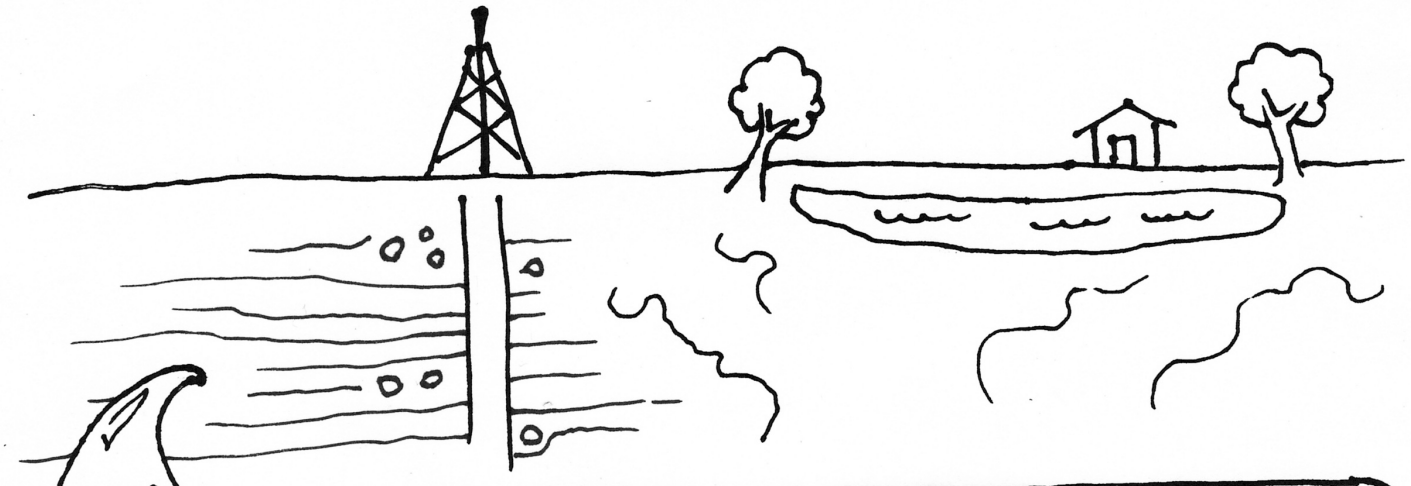



But that polluted water stays in the ground!
Plants and animals are hurt by the polluted water.

For people living nearby, it can make their drinking water not safe to drink.



People get sick because the chemicals are all around their environment.



How would you feel if you lived next to the natural gas well?


I pledge....


I pledge....


I pledge....


I pledge....

Trash Masters

Aim
Students explore the impacts of garbage on our environment, and discover ways to produce less garbage.

Summary
Students play a game to understand recycling, composting and garbage.

Standards
CCSS: Math, Grade 3, OA: Represent and solve problems involving multiplication and division.

CCSS: ELA, Grade 2, SL1: Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups.

NYS: Social Studies, 3.1a: Study how people live, work and utilize natural resources.

NYS: Social Studies, 4.1c: Know that scarcity requires individuals to make choices, and that these choices involve cost.

Materials

- Dry erase board and markers
- Collection of 5-6 types of clean waste items, for each small group (i.e. newspaper, banana peel, plastic bottle), in trays
- Recycle & Compost Guide
- Three bins in the center of the room, labeled “compost,” “recycle,” and “garbage”
- Blank paper (optional)
- Colored pencils or markers (optional)
- Seasonal tasting

Vocabulary

- recycle
- garbage
- compost

Adapted from Onondaga Resource Recovery Agency.

Procedure: Day One

Opening Circle (10 minutes)

- *Quick math problem! If every single person makes 4 pounds of garbage every day, how many pounds does each person make a week? Turn and talk to your partner. Be sure to explain how you got your answer.*
- Go over the answer.
- *OK, if we make 28 pounds a week, turn and talk to your partner about how many pounds we make a month.*
- Go over the answer.
- *OK, enough math! That's a lot of garbage per person. Think about how much garbage that makes per neighborhood, or per school!*
- *Who can tell me why making so much garbage is a problem? Where does that garbage all go?*
- Pass out landfill visuals. Write the word "landfill" on the board. *A landfill is an area that designated for trash to be dumped. It doesn't just disappear, but can stay there for a long time – maybe thousands or hundreds of thousands of years! Why might we want to make our landfills smaller, with less garbage? What could we do instead with all that land that's used for landfills?*
- *How can we reduce the amount of garbage in our landfills?* Write up three Rs: "reduce," "reuse," and "recycle." *And who can tell me how our garden helps us solve the problem? I'll give you a hint—it has to do with the amount of food we waste.*

Inquiry Activity One (30 minutes)

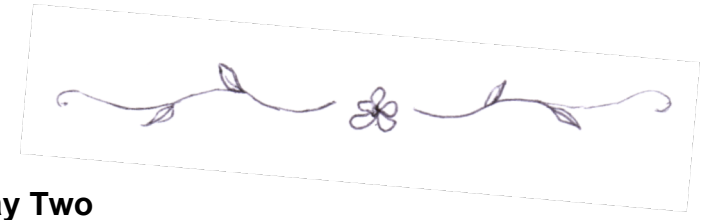
- Put students into small groups of 5-6 students each. *Today we're going to play a game. In this game, it's your job to decide if each item can be composted, recycled, or has to be put in the trash.*
- Pass out Recycle & Compost guides. *I'm going to give you a little cheat sheet, though, with some pictures and descriptions of what items can be composted or recycled. If it can't be composted or recycled, where does it go?*
- Model one round of the game. Hold up a plastic water bottle, or other item. *Look at your cheat sheet. Can I put this in the compost? Can I put this in the recycling bin? Where does this item belong?* Model putting the item in the correct bin.
- On the board, write in the item on the board, and check the column for the bin where you placed the item.
- *Each group is going to get a tray with items. Just leave the items for now; you'll be using them one at a time. For each round, I'll tell the group to take out an item. Discuss within your group where the item should go. Choose one person to be the Trash Master for that round, and that person will be the one to place the item in the correct bin. For each round, we'll choose a*

different Trash Master, so be sure your Trash Master is someone who hasn't been Trash Master before.

- *Once everyone is finished deciding, I'll say, "Trash Masters Up!" and all the Trash Masters should stand up with their items. Then I'll say, "Trash Masters Go!" and the Trash Masters should put the items in the correct bin, based on what your group decided. Remember, it's not a race; there's no extra points for putting in the item in the bin quickly. If there's any disagreement between the groups, we'll talk about it.*
- Do 5-6 rounds, each time adding the item to the chart on the board.
- At the end, ask students, *What were the items that we could recycle? What were the items that we could compost?*
- If time allows, supplement with the following: *Since you are all truly Trash Masters, it's your job to teach others about how they can recycle and compost. You're going to make a poster to teach others about the things that they can recycle or compost. You should include at least one item on your poster, but you can include more than one if you look. Look at the cheat sheet from before for ideas about other items that can be recycled or composted.*
- If students need attention prompting, solicit student ideas for catchy slogans that they could use on their posters. Model an example: *Composting is very a-peel-ing* (with a picture of a banana peel).
- Pass out paper and colored pencils or markers. Rotate through students, assisting as needed.

Closing Circle (10 minutes)

- Have students share posters, if they did them. *Great work today, everyone! Can someone remind me why we want to reduce the amount of trash that we make? Where does it go again? What happens to it?*
- Share a seasonal tasting.



Procedure: Day Two

Opening Circle (10 minutes)

- Remind class what they did yesterday, asking students to recap.

Garden Job (30 minutes)

- Have students do a garden job related to waste reduction: shredding browns, sifting compost, etc. They could also do an art project that involves reuse or recycling: making birdhouses from empty cartons, making paper, etc.

Closing Circle (10 minutes)

- *How did our garden job today help us to reduce waste?*

Adapted from Onondaga Resource Recovery Agency.

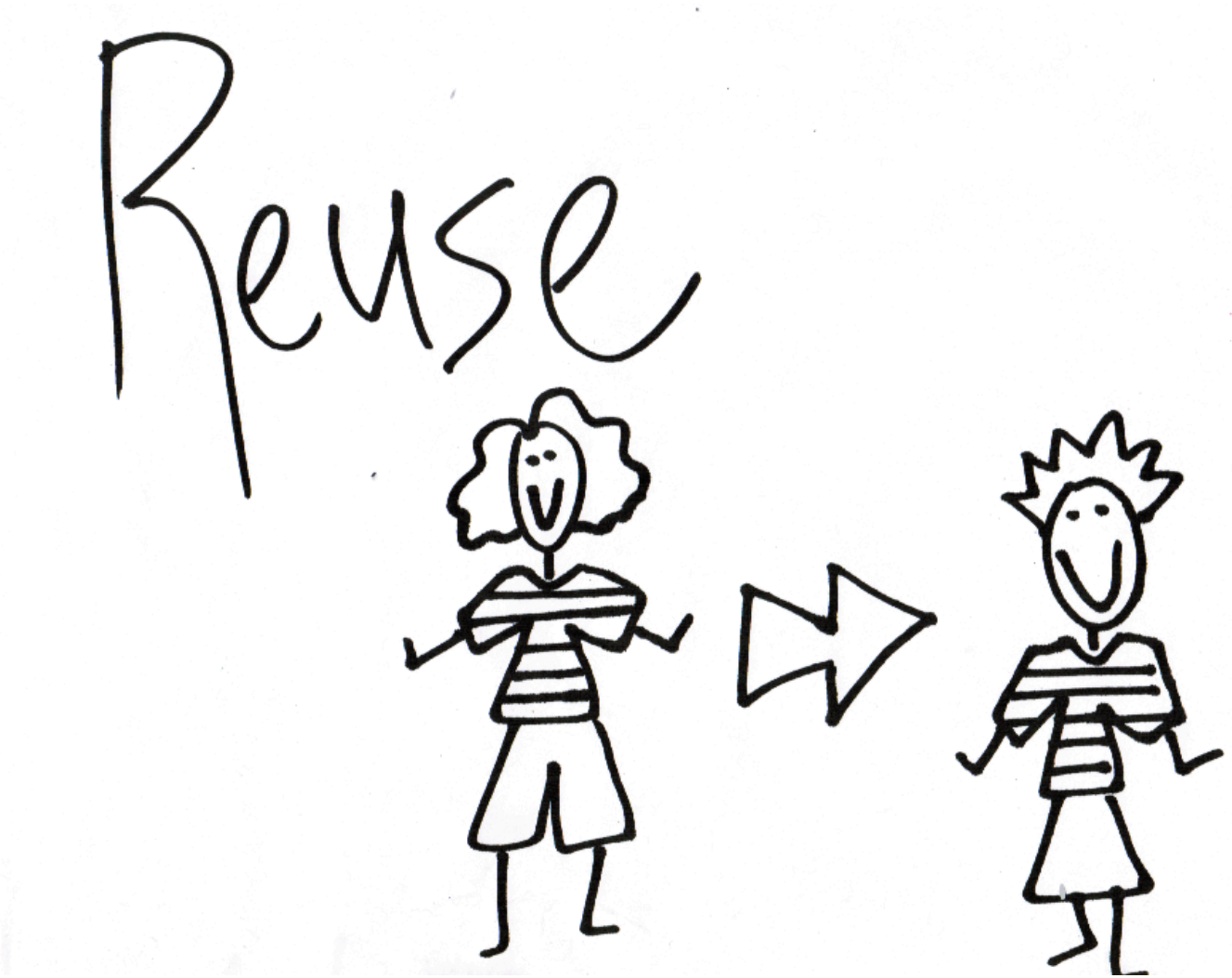
Common Core State Standard Extensions

ELA, Grade 3, W1: Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g. *because, and, also*) to connect opinion and reasons, and provide a concluding statement or section.

- Have students write a letter to someone about the need to compost, reuse, and/or recycle. They can write to the principal, the mayor, the head of school foods at the DOE, their congressman, President Obama, the newspaper, etc. Students could create their argument for why we should produce less garbage and provide supporting evidence stating how or why we can do this.

Other Extensions

Math: Garbage word problems. Use the garbage quiz and/or their tally sheets to create word problems based on garbage, reuse, compost and recycling.

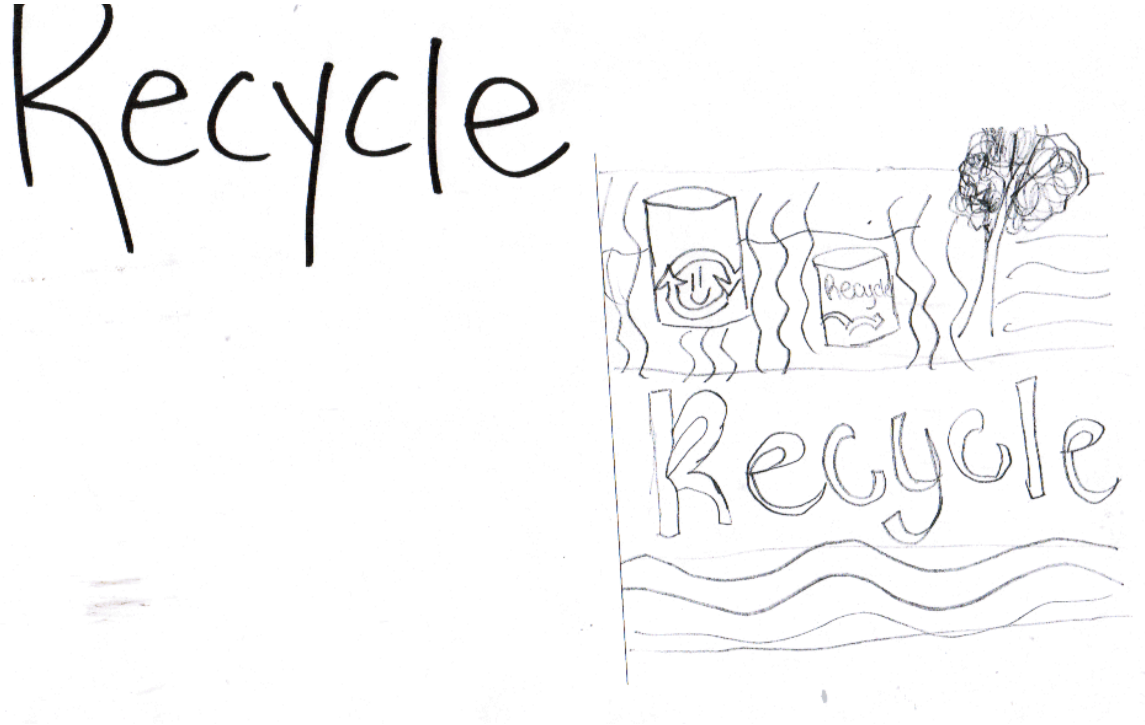


Adapted from Onondaga Resource Recovery Agency.

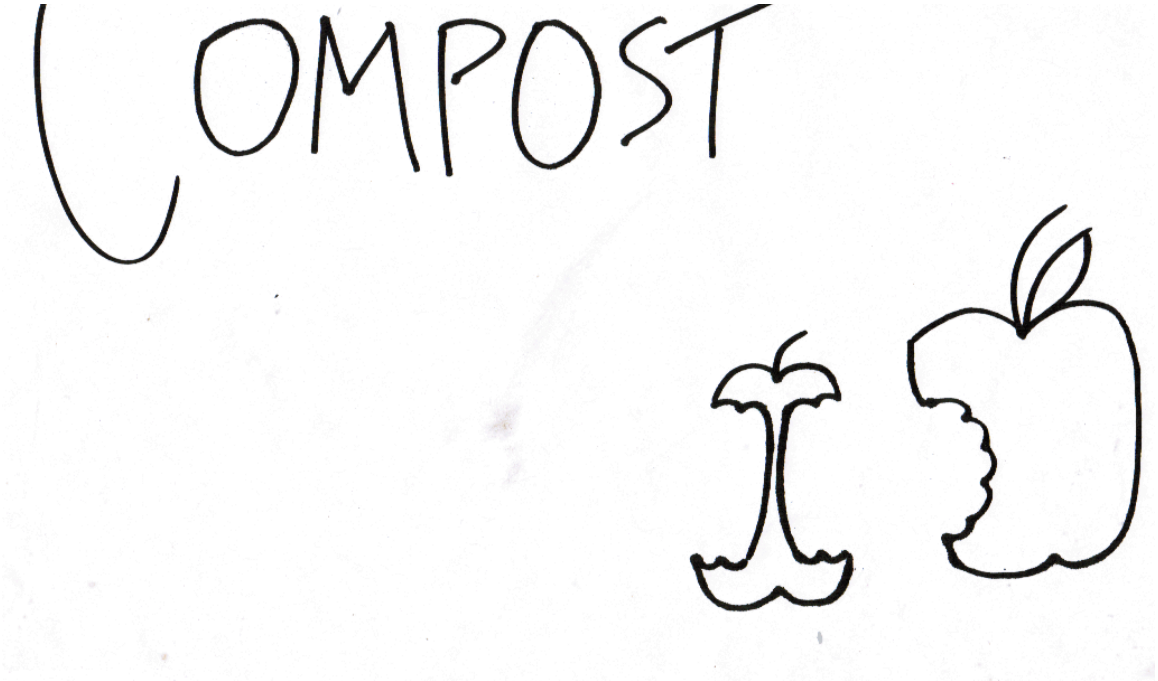
Recycling and Compost Guide:

You can **compost**	You can **recycle**	You **CAN'T** recycle or compost
Newspaper	Aluminum cans	Candy wrappers
Food scraps	Cardboard milk cartons	Plastic bags
Straw	Plastic milk cartons	styrofoam
Grass	Juice boxes	plastic wrapping
Leaves	Metal cans	Plastic yogurt containers
Paper bag	newspaper	Plastic food containers
	White paper	
	Paper bag	

Adapted from Onondaga Resource Recovery Agency.



Garbage



Garbage Quiz

1. How many pounds of food do Americans waste a year?
   A. 1.5 billion pounds
   B. 42 billion pounds
   C. 96 billion pounds

2. How many people could we feed with the food Americans waste every day?
   A. 1.5 million
   B. 4 million
   C. 80 million

3. How much garbage does the average American produce every day?
   A. more than one pound
   B. more than two pounds
   C. more than four pounds.

4. How many plastic bottles does the U.S. throw away every second?
   A. 65
   B. 252
   C. 694

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   A. 65
   B. 252
   C. 694

Food Web

Aim
Students will be able to describe how organisms are interconnected in a garden food web and what happens when the food web is disrupted.

Summary
Students will reenact a garden food web to better understand the role of producers and consumers as well as the interconnectedness between animals, plants, soil and sun in a garden.

Standards
CCSS: ELA, Grade 3, SL1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts,* building upon others' ideas and expressing their own clearly.

NYS: Science, LE 6.1 a, d: Classify populations of organisms as producers, consumers or decomposers by the role they serve in the ecosystem.

Materials

- Dry erase board and markers
- Balls of twine or string
- Food Web necklaces
- Seasonal tasting

Vocabulary

- producers
- consumers
- food web
- herbivore
- carnivore
- omnivore
- decomposers
- photosynthesis

Procedure: Day One

Opening Circle (10 minutes)

- *Today we're going to talk about how everything in the garden is connected in a food web. Who can explain what a web is? What other examples of webs do you know?*
- *In a food web, we make connections based on who is eating what and who is getting eaten. Can you give me an example of something from our garden that gets eaten? Cnyou think of something in the garden that eats other things?*
- *So, it's probably pretty obvious that plants get eaten. But plants actually need to eat too. Where do plants get their food? Does anyone know what that is called?* Write "photosynthesis" on the board and explain. *So the sun is actually the beginning of any food chain.*
- *Today, you are each going to be part of the food web in the garden. You need to figure out how your web is connected. What do you eat? What eats you?*

Inquiry Activity One (25 minutes)

- Divide class into two groups, if possible, or conduct the activity as one large group. Give each student a food chain card necklace. *Everyone look at your cards. See what kind of living thing you are and what you eat.* Call on a few volunteers. *What do you eat? What eats you?*
- Model with another student. *I am the sunflower. He is the white-throated sparrow. How are we related to one another? The sparrow eats the sunflower.*
- Start with one student, holding the string. Have the student name another animal or plant that they are connected to. Unwind the string and connect the next student, starting to form the web. Facilitate moving the ball of string in the group until all students are included in the web. *What does the string look like now? A web! We're all connected in the food web.*
- Demonstrate what would happen with something removed from the food web. Have some of the plants (i.e. all the students with blackberry necklaces) drop their strings. *What would happen if there were no blackberries in our garden? How does that weaken our food web?*
- *What happens then to the animals that eat the blackberries?* These students should drop their strings.
- *What happens if something goes missing from our food web?*

Closing Circle (10 minutes)

- Write the words "producer," "consumer," "herbivore," "carnivore," "omnivore," and "decomposer" on the board with space underneath each word.
- *How many of you provided food to another living thing? Raise your hands.* Call on students who were producers and write down what role they played in the board (blackberry, broccoli, etc.).

- *How many of you ate something in the food web?* Write down all the consumers.
- *How many of you only ate plants? Does anyone know what we call animals who eat plants?* Write down all the herbivores.
- *How many of you only ate animals? Does anyone know what we call animals who only eat other animals?* Write down the carnivores.
- *How many of you ate both plants and animals? Does anyone know what we call animals who eat both plants and animals?* Write down the omnivores.
- *In our story, we didn't have any decomposers. What does a decomposer do? What animals in our garden are decomposers?*
- Share a seasonal tasting.

Common Core State Standard Extensions

ELA, Grade 3, W1: Write opinion pieces on topics or texts, supporting a point of view with reasons.

- Students pick a plant or animal that is part of the garden food web and write a persuasive paragraph about why that plant or animal is important to our garden and to ourselves.

Other Extensions

Science: Research a case where the food web gets disrupted (such as invasive species in the United States). Have students write a brief report and present their findings.

SQUIRREL

I eat **sunflowers, blackberries,** and **oak trees**

Red-tailed hawks and **cats** eat me

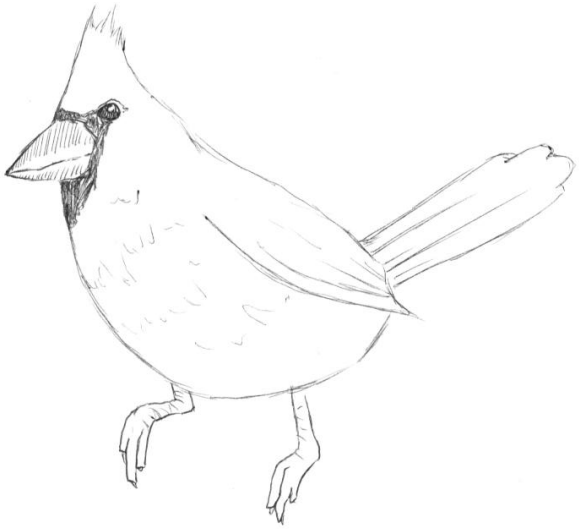
OAK TREE

Squirrels and **white-throated sparrows** eat me

BLACKBERRY

Squirrels, white-throated sparrows, chickens, and **cardinals** eat me

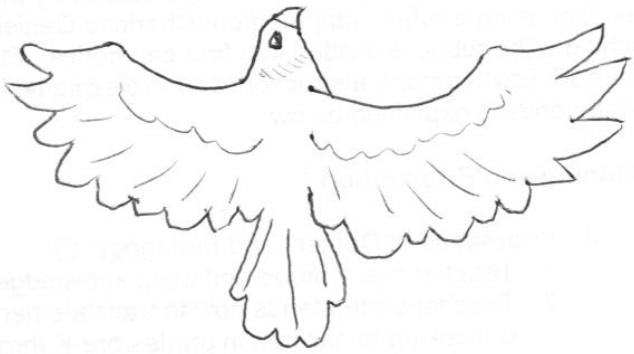
CARDINAL



I eat **blackberries, sunflowers, ladybugs,** and **June bug larvae**

Red-tailed hawks and **cats** eat me

RED-TAILED HAWK



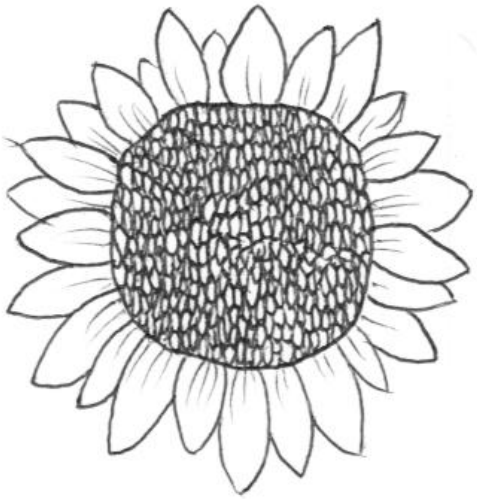
I eat **squirrels, cardinals,** and **white-throated sparrows**

WHITE-THROATED SPARROW

I eat **sunflowers, oak trees, blackberries, white flies,** and **June bug larvae**

Red-tailed hawks and **cats** eat me

SUNFLOWER



Squirrels, June bug larvae, cardinals, chickens, and **white-throated sparrows** eat me

JUNE BUG LARVAE

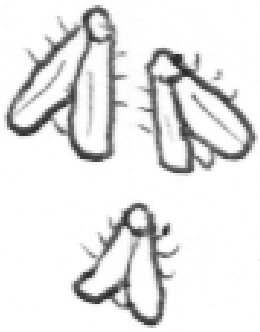
I eat **sunflowers** and **broccoli**

White-throated sparrows, chickens, and **cardinals** eat me

BROCCOLI

White flies, chickens, and **June bug larvae** eat me

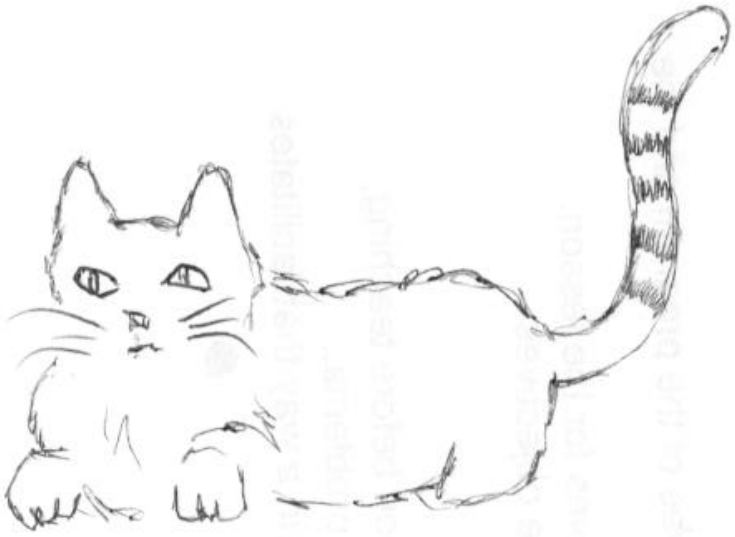
WHITE FLIES



I eat **broccoli**

Ladybugs, chickens, and **white-throated sparrows** eat me

CAT



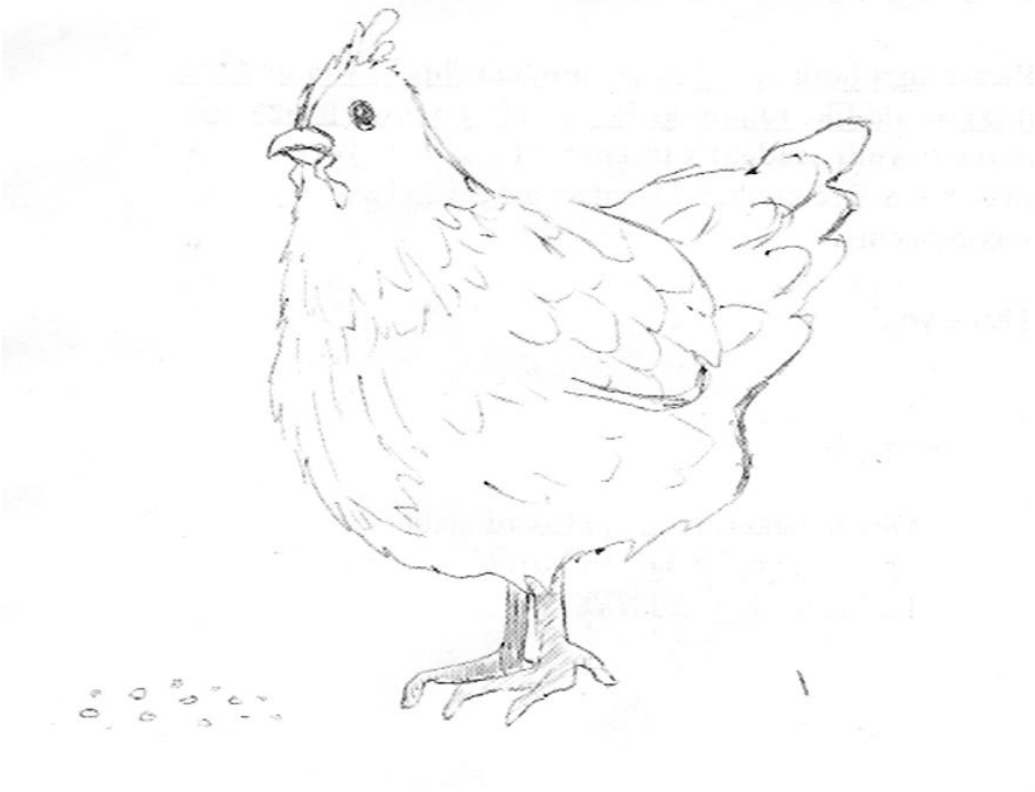
I eat **white-throated sparrows** and **cardinals**

LADYBUG

I eat **June bug larvae** and **white flies**

White-throated sparrows, chickens, and **cardinals** eat me

CHICKEN



I eat **sunflowers, blackberries, broccoli, June bug larvae, ladybugs,** and **white flies**

Sensory Poetry in the Garden

Aim
Students make sensory observations in the garden and turn their observations into descriptive poetry.

Question of the Day
What is the garden like in winter? How can we use our words to express what it is like to others?

Standards
CCSS:ELA, Grade 3, W3: Write narratives to develop real or imagined experiences using effective technique, descriptive details and clear event sequences.

CCSS: ELA, Grade 3, RL 4: Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem or song.

NYS: Science, PS 3.1: Observe and describe properties of materials.

Materials

- Langston Hughes poem, "April Rain Song"—one copy to read aloud, one copy for everyone in the class
- Sensory Observations worksheet
- Blank paper
- Clipboards
- Pencils
- Seasonal tasting

Vocabulary

- sensory
- frigid
- crisp
- still
- dormant

Procedure: Day One

Opening Circle (10 minutes)

- *I'm going to read you a poem called "April Rain Song" by Langston Hughes. Langston Hughes was an African-American poet who went to college in New York City and fell in love with Harlem where he lived off and on for the rest of his life. As you listen to his poem, see if you can notice how many senses he uses to describe this moment in spring.*
- *Who can remind me of the five senses?*
- Read the poem:

  April Rain Song
  By Langston Hughes

  Let the rain kiss you.
  Let the rain beat upon your head with silver liquid drops.
  Let the rain sing you a lullaby.

  The rain makes still pools on the sidewalk.
  The rain makes running pools in the gutter.
  The rain plays a little sleep song on our roof at night.

  And I love the rain.

- Read the poem one more time.
- *Who noticed an example of the sense of sight?*
- *Who noticed an example of the sense of touch?*
- *Who noticed an example of the sense of feel?*
- *Which senses are not mentioned?*
- *What is the mood of this poem?*
- Students also might enjoy the William Carlos Williams poem, "This is Just to Say." You can add this one if you like, either as a read-aloud or as with the Langston Hughes, something the kids can have copies of to follow along with.

  This is Just to Say
  By William Carlos Williams

  I have eaten
  the plums
  that were in
  the icebox

  and which
  you were probably
  saving

for breakfast

Forgive me
they were delicious
so sweet
and so cold

Inquiry Activity One (15 minutes)

- *We are going to take a sensory tour of the garden so we can write a poem that really describes what it is like right now.*
- *As you walk through the garden, jot down your observations on this sheet of paper. As you can see, it asks you what you see, hear, smell and feel as you walk through the garden in winter. You'll have to keep your senses sharp, because things in the garden are much less obvious at this time of the year.* If you are concerned that the kids will rush through this, you can tell them to try and find five observations for each category (sight, sound, touch, smell, feelings/thoughts).
- Give students Sensory Observation sheets, clipboards, and pencils.
- *Here's where you can record your sensory observations. You'll notice that one of the senses is missing—which one? That's right—we aren't going to have you taste anything on this tour. But instead of taste, there's a column that's not a sense at all. It's for feelings and thoughts. Who can give me an example of a feeling or thought they might have about the garden? We can also think about this as "mood." What might your mood be as you walk through the garden in winter? Or what might the garden's mood be in winter?*

Inquiry Activity Two (20 minutes)

- Return to the classroom or to the hoophouse and help the kids come up with sensory vocabulary: frigid, crisp, still, dormant, etc. Have them brainstorm some other words, which you can write on the board. They might tell you the objects they saw, heard, etc. (flower, wind), and you can try to push them to describe those things.
- You can also have students describe poetic techniques that they are familiar with: rhythm, rhyme, simile, metaphor, etc.
- *Think about the mood you want to show from the garden. Think about how Langston Hughes creates mood in his poem. He never says he is happy—he just shows it with the words he uses to describe the April rain.*
- Give students time to write their poems.

Closing Circle (10 minutes)

- Ask for volunteers to read their poems, or at least their sensory observations.
- Share a winter tasting.

Common Core State Standard Extensions

ELA, Grade 3, SL 5: Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.

- Students can finish, polish, record and illustrate the poems they began in the garden. Poetry slam!

Other Extensions

- Math: Winter starts December 21st and end March 21st. How many days of winter are there? Look up sunrise and sunset times for December 21st, the shortest day of the year, for New York. How many hours of daylight were there? What about in Stockholm, Sweden? What about in Quito, Ecuador?
- Students can write sensory poetry about other topics.
- Students can read other poems about seasons and gardens.

This Is Just to Say

I have eaten
the plums
that were in
the icebox

and which
you were probably
saving
for breakfast

Forgive me
they were delicious
so sweet
and so cold

April Rain Song

By Langston Hughes

Let the rain kiss you.
Let the rain beat upon your head with silver liquid drops.
Let the rain sing you a lullaby.

The rain makes still pools on the sidewalk.
The rain makes running pools in the gutter.
The rain plays a little sleep-song on our roof at night—

And I love the rain.

Seed Dispersal

Aim
Students will identify different ways seeds have adapted to aid their own dispersal.

Summary
Students build models of seeds that can float in water, float through the air, or attach to animals.

Standards
CCSS:ELA, Grade 3, RI 4: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 3 topic or subject area.*

CCSS: ELA, Grade 3, SL 4: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant descriptive details, speaking clearly at an understandable pace.

NYS: Science, LE 3.2 a,b: Recognize that individual variations within a species may cause certain individuals to have an advantage in survival and reproduction.

NYS: Science, S2e: demonstrates understanding of evolution, diversity, and adaptation of organisms.

NYS: Science, S5b: uses concepts from science standards 1-4 to explain a variety of observations and phenomena.

Materials

- Variety of seeds for demonstration purposes
- Visuals of animal adaptations
- Buckets with water
- Materials for seed-building activity (i.e. rubberbands, toothpicks, balloons, scissors, pencils, plastic bags, corks, cotton, feathers, tacks, metal springs, wire)
- Bolts or washers to represent seeds, or actual seeds
- Sets of instructions for each small group
- Seed flats and seeds to plant
- Tasting (apples, or other seasonal tasting)

Vocabulary

- disperse/dispersal
- adaptation/adapt

Procedure: Day One

Opening Circle (10 minutes)

- Write "adaptation on the white board. Ask for volunteers to explain what it means for plants or animal to "adapt."
- If possible, using the students' answers, explain that plants and animals change over many generations in ways that help them survive better in their particular environments—write the definition on the board.
- *Can you think of a time when you have had to adapt to some change? What do you do in the fall when the weather changes from warm to cold? Have you ever moved to a new place or a new school? What did you do to adapt to that new setting?*
- Hold up a picture of a polar bear in a snowy environment next to a grizzly bear in a temperate environment. Ask for volunteers to suggest ways the polar bear and grizzly bear might have adapted over time to survive in their environments.
- Write "dispersal" on the board. Explain that one ways that seeds adapt is to help with their dispersal. *Can anyone tell me what "dispersal" means?* If possible, using students' answers, explain that dispersal is how seeds go from the plant that produces them into the ground to produce new plants.
- Show pictures of seeds dispersing in different ways: a coconut floating on the water, an oak seed and/or dandelions flying through the air. *How has each of these adapted for better dispersal?*

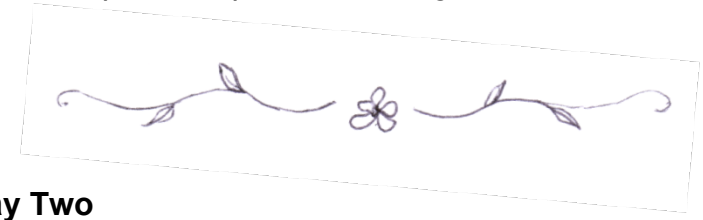
Inquiry Activity One (30 minutes)

- While the students are still in the circle, explain that they are going to play Mother Nature, and help seeds adapt to a specific challenge. Tell them they will be given seeds and materials they can use to help the seeds adapt.
- Divide students into groups of three or four.
- Give each group of students seeds (or materials to represent seeds), adaptation materials, and written instructions.
- Go over instructions and check for understanding. In particular, take time with the words in italics to make sure students are clear on the meaning.
- Give students 10 minutes to come up with their adaptations.
- Let each group share his or her adaptations.

Closing Circle (10 minutes)

- *One of the most interesting ways that plants disperse their seeds is by using animals. We saw how plants can hitchhike on fur, or on your*

clothing. What is another way that animals disperse seeds? (Squirrels bury acorns, birds eat berries and poop the seeds...)
- *How is seed dispersal important to our garden? To us?*



Procedure: Day Two

Opening Circle (10 minutes)
- *Yesterday we helped seeds adapt to their environment to help them disperse. Who can remember some of the things we did? Who can remember some of the ways that plants disperse? Today we are going to help the plants. Rather than having them disperse on their own, we are going to plant them directly in the ground.*

Inquiry Activity (30 minutes)
- Plant seeds in flats, make seed balls, or do another seed-related garden job.

Closing Circle (10 minutes)
- *What did we do in the garden today?*
- *How did we help the plants with growing new baby plants?*

Common Core State Standard Extensions

ELA, Grade 3, W 3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
- Students write a piece from the perspective of a seed who is dispersing. As the seed, they should explain the reason for their journey, the way they plan to travel, and how they have learned to travel in that particular way.

Other Extensions

- Math:"Acorns are seeds for oak trees. Acorns can be dispersed by squirrels who bury the acrons, hoping to find them and eat them later on. If an average squirrel buries 6 acorns a day, how many acorns will 4 squirrels bury? 6 squirrels, 8 squirrels?"
- Write a fiction or non-fiction piece that uses the theme of adaptation in your own life—how have you changed to function better in your own environment?

Animal Adaptation Images

By Alan Wilson (www.naturespicsonline.com: [1]) [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons

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Seed Dispersal Images

By Alex Valavanis (Flickr) [CC BY-SA 2.0 (http://creativecommons.org/licenses/by-sa/2.0)], via Wikimedia Commons

If you would like to find examples of seeds which disperse through water, Google “coconut floating water.”

If you would like to find examples of seeds which disperse by attaching onto animals, Google “burrs on dogs.”

Dispersal Instructions:

Today you will be playing mother nature and help seeds **adapt** to their **environment**:

- Your seeds need to be able to **float** on water so they can travel.
- Use the materials you have to help your seeds **float in water for 5 minutes**.
- Test your seed **adaptation** in the bucket of water.

Today you will be playing mother nature and help seeds **adapt** to their **environment**:

- Your seeds need to **hitch a ride** on the fur of an animal for **at least 20 feet**.
- Use the materials you have to help your seeds attach themselves to a passing animal.
- Test your seed **adaptation** by trying to get it to stick to your clothing.

Today you will be playing mother nature and help seeds **adapt** to their **environment**:

- Your seeds need to **fly through the air for at least 2 feet** from their parent plant.
- Use the materials you have to help your seed fly.
- You can test your seed **adaptation** by very carefully throwing your seeds — **make sure no one is standing nearby!**

Today you will be playing mother nature and help seeds **adapt** to their **environment**:

- Your seeds need to be able to **float** on water so they can travel.
- Use the materials you have to help your seeds **float in water for 5 minutes**.
- Test your seed **adaptation** in the bucket of water.

Today you will be playing mother nature and help seeds **adapt** to their **environment**:

- Your seeds need to **hitch a ride** on the fur of an animal for **at least 20 feet**.
- Use the materials you have to help your seeds attach themselves to a passing animal.
- Test your seed **adaptation** by trying to get it to stick to your clothing.

The Bee Lesson

Aim
Students will learn more about bee communitites and why bees are important to our agricultural system and garden.

Summary
Students will listen to a recording narrated by a bee and will brainstorm solutions to the problems that threaten bees.

Standards
CCSS: ELA, Grade 3, SL2: Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

Materials
- Dry erase board and markers
- Bee box
- Device to play bee recording (recording accessible here: Bee Recording)
- Bee Problem fact sheet
- Blank paper
- Colored pencils
- Honey tasting
- Popsicle sticks for tasting

Vocabulary
- nectar
- pollen
- chemical

Procedure: Day One
Opening Circle (5 minutes)
- *Hi, everyone! Today, we're going to be learning about my favorite garden friends, the bees. Today is going to be very full and exciting, so let's warm up our bodies the way that the bees do: with some bee dancing.*
- *Bees don't talk or use words like we do. Instead, they do dances. The name for bee dances is called the "waggle dance." Different dances mean*

different things. One dance might mean "There is danger!" or "I found a really delicious flower over here." Let's do some waggle dancing.

- *I'm going to teach three very important dance moves: "I found food," "I found water," and "Danger!" Repeat them after me.* Teach students a movement to accompany each message, then have them practice.
- *Great. Now to get started, let's make a list on the board of everything we know about bees.* Solicit student ideas, and write them up on the board.

Inquiry Activity One (10 minutes)

- Begin the bee recording from inside the box so a loud buzzind sound comes from the box. *Oh my! Can you hear that? We just got a very special package!! It's heavy. Who do you think it might be from?*
- Teachers pull out a hidden bee striped box emitting a buzzing sound. *Can I have a volunteer open this for us? It looks like it is a message. Let's hear it.*
- The text of the recording is as follows:
    - *Hello? Hello? Can you hear me? This is a very important message for the 3rd graders. My name is Beatrice, and I am a honeybee. Actually, I am the queen of my hive, so you may call me Queen Beatrice, or Queen Bea for short. Well, anyway, I am calling you students because we bees are in big trouble. Pleeeeeze help us.*
    - *For many yearzzz, we have helped you humans by pollinating the plants in your gardens and farms. Bees like to drink the sweet nectar inside of flowers. While we are drinking nectar, we get covered in the sticky pollen that is also inside that flower. Then we spread the pollen powder from one flower to another flower. If that pollen didn't get spread by that, some plants wouldn't grow at all. Without us, you humans wouldn't have apples, mangoes, kiwi, avocados, beans, coffee, lemons, tomatoes, grapes, berries, broccoli, cabbage, cucumbers, tangerines… Whew. I could keep listing foods all day. There are hundreds of foods that bees help grow. My point is: without bees your plants wouldn't grow, and you would have nothing to eat. We may be tiny, but we are the heroes of the garden.*
    - *We've helped you a lot, but we need your help. We're friends, right? And friends help each other. For the past 10 years, bees around the world have been in big trouble. Every year, ⅓ of bees in the United States dies. ⅓ is a lot. That means that one out of every 3 bees dies. If this keeps happening, soon we won't have any more bees. That would be horrible! I'm going to tell you what is happening to the bees, and I hope you can find some solutions. Can you help us? Please? We bees are counting on you!*
    - *The bees have 3 big problems. The first problem started when you humans started pulling out the plants that grow naturally and started growing only your favorite growing fruits and vegetables. Instead of growing gardens, like you used to, gardens with some*

trees, lots of different fruits and vegetables and our favorite flowers, now most farmers just grow fields of fields of things of things of just one kind of plant. This is bad news for the bees. We need things to eat, and we like variety!

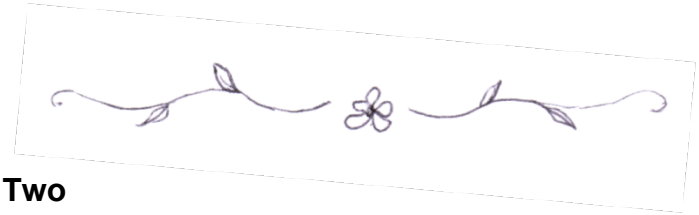
- *Also, you people keep building buildings and also cities. There are very nice, but there aren't very many places for a bee like me to live in a grassy park or a city building. We need some flowers to get nectar out of!*
- *Finally, our biggest problem. Some people -- not at your garden, but other people -- spray a chemical on the plants to keep away the bugs. They don't like the bugs because sometimes, some bugs like to nibble the leaves or roots of the plants. Is that so wrong?! Bugs need food, too. Anyway, lots of farmers have started keeping those nibbling bugs away by spraying strong chemicals on all their plants. But those chemicals hurt the nice, helpful bugs, too, like us and our friends the ladybugs, and butterflies, and spiders. When those chemicals are sprayed on plants and we drink their nectar, we bees get really sick and sometimes even die.*
- *So, those are our 3 big problems. We really need you to help solve them. I wrote them down for you so you can remember all of them. We are counting on you smart people to help teach the rest of your school that bees aren't scary. We're actually wonderful and important, and we want to be friends with you! Pleazzzzz solve our problems!*

Inquiry Activity Two (20 minutes)

- *Woah, that sounds like a serious problem, gardeners. Do you think we can help our friends the bees? Let's try!* Hand out Bee Problem worksheet. *Let's read through these Big Bee Problems together.* Read the worksheet together.
- *Gardeners, I'm going to break you up into groups/partners. Each of your groups should pick one big bee problem. When you have picked one problem, try and think of some different ways that we help solve those problems.*
- If time allows, have students make posters to teach others about how to help bees.
- *When you have your ideas, I'd like the people in your group to make bee information posters teaching the people in our neighborhood community what they can do to help take of the bees. We can hang these posters up in our garden and school and neighborhood to help people learn about bees!*
- *For example, if my group is trying to solve the second problem, my poster could say: "Dear Gardeners, our bees are in trouble! Please plant some flowers for them to drink while they are in our cities."*

- *I should also explain why I think it's an important thing to do. "We should plant flowers because…" Remember to use all of that good information you now have about bees!*
- Hand out papers and writing materials.

Closing Circle (10 minutes)
- *Bee-youtiful work, gardeners. What were some of your ideas for how we could help our friends the bees?* Write students ideas on the board.
- *Queen Bea left a special present for us to thank us for helping solve the Big Bee Problems!*
- Share a honey tasting.



Procedure: Day Two
Opening Circle (5 minutes)
- Welcome students back to garden class.
- *Remind me, what did we learn about bees last time? What are the problems facing the bees? What can we do to help bees?*
- *Today, we are going to do some garden work to help our friends, the bees.*

Inquiry Activity (35 minutes)
- Lead students in a seasonal garden job, making connections, if possible, to what they learned about bees. Reference the lesson plans for transplanting and seed starting for more information.

Closing Circle (5 minutes)
- Have students share out about their garden work.
- *Did anyone see any bees in the garden today? Thank you for helping the bees today!*

Common Core State Standard Extensions

ELA, Grade 3, W1: Write opinion pieces on topics or texts, supporting a point of view with reasons.
- Students write an article to convince others to help save the bees. Have students include evidence in their articles and suggest actions that readers can take.

Three Big Problems for the Bees

Please help us solve these problems!

1. There are not enough different foods for the bees to eat!! Farmers are pulling out wild flowers, weeds and other plants to make room for their farms. On their farms they only grow one kind of plant. Bees like to drink from lots of plants!

2. When you humans build cities, most of the time you don't leave any space for the plants. Bees need those plants to live! That means that bees don't have anything to eat when they fly through cities. Bees can't live in cities, or even fly through them, without plants to drink nectar from.

3. Some farmers spray chemicals on their plants to keep the bugs away. But not all bugs hurt plants! In fact, many bugs really help plants. If bees drink from plants that have chemicals sprayed on, they can get really sick!

Pests in the Garden

Aim
Students will understand how pesticide use adversely affects other living things within the garden community.

Summary
Students play a game to demonstrate how pesticides affect other animals in the food chain, then do a garden job to control pests without the use of pesticides.

Standards
CCSS: ELA, Grade 3, SL4: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

NYS: Science, LE 7.1c: Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms.

Materials

- Dry erase board and markers
- Have You Seen These Garden Pests? worksheet
- Visuals of pesticide use
- Example of in-home pesticide (i.e. Raid)
- "Food" necklaces, some with blue lanyards and some with green lanyards
- Materials for making garlic spray, or for another garden job (optional)
- Seasonal tasting

Vocabulary

- pest
- pesticide
- poison
- food chain/food web

Adapted from "Food Chains Are Not a Necklace!", http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

Procedure: Day One

Opening Circle (5 minutes)

- *Today we're talking about bugs in our garden. What are some of the jobs that bugs do in our garden?* Have students give a few examples, such as worms making compost or bees pollinating flowers.
- *You're right that all bugs have different jobs that they do in the garden. Sometimes, there are bugs in our garden that eat our fruits and vegetables. The word that farmers or gardeners use for these bugs or animals is "pests." It's not their fault, because they need to eat, too, but that's what they do! Today, we're going to learn about these bugs and the best ways to deal with them in our garden.*

Inquiry Activity One (10 minutes)

- Pass out visuals of different garden pests. Ask students if they recognize any of these garden pests. *What would happen if our garden was full of these pests? What would happen to our fruits and vegetables? They would eat them all up!*
- *Farmers and gardeners have different strategies for dealing with these bugs on their farms or gardens. One way is by spraying a chemical poison called a "pesticide."* Write the word "pesticide" on the board. *Can anyone take a guess what a pesticide does? A pesticide is a kind of poison that makes the bug die. Sometimes, the pesticide kills the bug just by being sprayed on them. Sometimes, the pesticide gets absorbed by the plant, and then once the bug eats the plant, then the bug dies.*
- Show an example of a pesticide meant for in-home use. *Sometimes, people use pesticides like these inside their homes to kill bugs or insects that they don't want in their houses. But farmers don't use a spray bottle like this.*
- Tell students that you are going to pass out some visuals of farmers using pesticides. Write prompting questions on the board:
    - *In the picture, are the farmers using a little bit of pesticides, or a lot of pesticides?*
    - *Do you think the farmer is just killing the pest bugs, or other bugs, too?*
    - *What would happen if the farmer accidentally killed other bugs, like worms or bees?*
- Discuss the visuals as a whole group. *Farmers who use pesticides may not be trying to hurt other bugs, but they can end up killing all the bugs on their farm! Why is it a problem if all the bugs on their farm get killed?*
- If time allows, discuss the visual with the farm workers spraying pesticides. *Do you think it would be safe for the farmer to have the pesticide chemicals on their skin, or to breathe them in? Using pesticides might not be good for the farmer or workers either.*
- *I think you guys understand that pesticides can end up hurting lots of bugs and insects on the farm or in the garden. But we're going to play a game to see how the use of pesticides affects other animals, too.*

Adapted from "Food Chains Are Not a Necklace!", http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

Inquiry Activity Two (25 minutes)

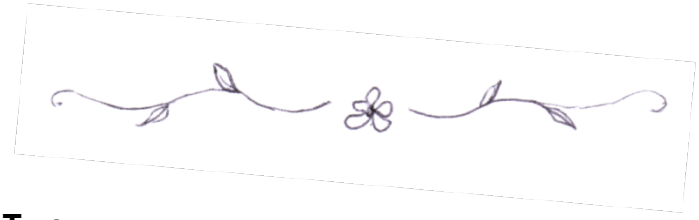
- *Remind me, what is a food chain? Can you give me an example of a food chain? In our game, our food chain is going to consist of caterpillars, sparrows, and hawks. Some caterpillars can be a pest that eats the leaves of plants in the garden.* Write the sequence of the food chain on the board.
- Assign half of the class to be caterpillars. Explain that they are going to go out in the garden and find some food. For each of them in the garden, there is a necklace with the word "food" written on it. Once they find the necklace with the food on it, they should stay in their spot and wiggle their bodies to show that they have eaten some food. (Be sure you have hidden all the necklaces fairly close by, so you can keep an eye on all students.)
- Assign a smaller portion of students to be sparrows, about half as many students as were sparrows. Tell the sparrows that they are bigger animals, and pretty hungry, so they have to go out and find their food. But their food is the caterpillars! Tell them to go out and find two caterpillars to eat. In order to "eat" the caterpillars, they should take their necklaces. Once they have eaten two caterpillars, they should stay in their spot and chirp like birds to show that they have eaten their food.
- Assign the remaining students to be hawks. They eat the sparrows. They are also pretty hungry, so they should find at least two sparrows to eat. In order to eat the sparrows, they should take the necklaces from two sparrows. Once they have taken the necklaces from two sparrows, they should stay in their spot and flap their wings to show they have eaten their food.
- Call the whole group back to the circle. If any caterpillars or sparrows are still wearing necklaces, you can take them back.
- *Okay, hawks. Each of you is wearing four food necklaces. Remind me why? You ate the sparrows, and the sparrows ate the caterpillars, which ate the food in the garden.*
- *Unfortunately, hawks, not all of the food that you ate is the same. Some of the food that was in the garden at the beginning of our game was poisoned with pesticides. If your food is on a blue lanyard, you're safe. But if you're wearing one with a green lanyard, that means you ate poisonous pesticides! And if you have two green lanyards, the poisonous pesticides have killed you!*
- *But wait! The hawk doesn't eat plants! How did the pesticides get into the hawks' bodies?* Solicit from students that, because the caterpillars ate the pesticides, the pesticides traveled into the sparrows and ultimately into the hawks.
- *Oh no! The poisonous pesticides got into the hawks, too? I didn't mean to make the hawks sick when I sprayed the pesticides on my farm!*

Closing Circle (5 minutes)

- *If a farmer or gardener sprays pesticides, does it just hurt the pests? What other animals can it hurt? How?*

Adapted from "Food Chains Are Not a Necklace!", http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

- *In our garden, we don't use poisonous pesticides. Why not? Why do you think we don't do that?*
- *The next time we're together, we're going to talk about ways that we deal with pests in our garden.*



Procedure: Day Two

Opening Circle (5 minutes)

- *What did we talk about the last time we were together? What are pesticides? What do they do? Why do farmers use them? Do pesticides just hurt the pests?*
- *Of course, it's the job of the farmer to be sure that the fruits and vegetables don't all get eaten! But all around the world, there are farmers who have pledged to not use pesticides for all the reasons that we talked about. Today, we're going to practice some of the ways that farmers and gardeners can protect their plants from pests in the least harmful way.*

Garden Job (30 minutes)

- Lead students in a garden job that contributes to pest control.
- One option is to have students use a garlic spray to deter pests. Discuss with students how the garlic spray acts to keep pests away. Let students smell it to see how potent it is! Assign students to work in small groups, carefully spraying the leaves and stems of established plants, being careful to not spray one another.
- (Note: The garlic spray needs to be made ahead of time. Mince three of four cloves of garlic, and mix into two teaspoons of mineral oil. Let the mixture sit overnight, and then strain the garlic out. Add the oil to one pint of water, and add a teaspoon of biodegradable dish soap.)
- Other options include planting habitat for predatory insects or animals, or covering crops with row cover. In either instance, explain how the method being used protects fruit and vegetable crops.
- If you have chickens in your garden, discuss how pests can become food for chickens. If you have pests that can be picked off, like cabbage moths, students can pick them off and collect them to be fed to chickens.

Closing Circle (10 minutes)

- Have students share out about their work.
- Share a seasonal tasting.
- *Thanks for being careful gardeners today, everyone. We can keep our plants protected from bugs without having to use poisonous pesticides!*

Adapted from "Food Chains Are Not a Necklace!", http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

Common Core State Standard Extensions

ELA, Grade 3, W1: Write opinion pieces on topics or texts, supporting a point of view with reasons.

- Have students write about pesticides from the perspective of a beneficial garden animal, such as a worm, bird, or butterfly. Students should try to convince the reader how and why pesticide use can have unintended consequences in the garden.

Other Extensions

Science: Have students draw a garden food web to the best of their ability, including and labeling the producers, primary consumers, and secondary consumers. Have students use this visual to accompany a persuasive text or presentation that shows the widespread effects of pesticide use on an ecosystem.

Adapted from "Food Chains Are Not a Necklace!", http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

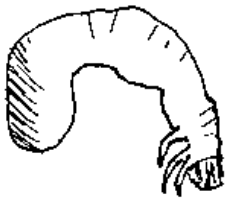
You found
food!

You found
food!

Adapted from “Food Chains Are Not a Necklace!”, http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

Have You Seen These Garden Pests?

Snails are slow, crawling creatures that like to eat tender baby plants.



Beetle grubs live underground and eat the roots of garden plants.

Aphids are tiny bugs that like to suck the sap out of plant stems.

Grasshoppers are jumping insects that chew holes in plant leaves.

Cabbage moth caterpillars especially like to eat broccoli, cauliflower, and, of course, cabbage.

Adapted from "Food Chains Are Not a Necklace!", http://extension.psu.edu/pests/ipm/schools-childcare/schools/educators/elementary/elemlessonplans/foodchains

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Three Sisters Planting

Aim
Students will understand how Native American planting techniques are still used in our garden, and how corn, beans, and squash help one another to grow.

Summary
Students will read a version of the Three Sisters legend to understand how corn, beans, and squash help each other grow in the garden. Students will then plant the Three Sisters together in the garden.

Standards
CCSS: ELA, Grade 3, R2: Recount stories, including fables, folktales and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.

NYS: Social Studies, 2.4b: Explore the lifestyles, beliefs, traditions, rules and laws, and social/cultural needs and wants of people during different periods of history and in different parts of the world.

NYS: Science, LE 3.1b,c: Describe how plants must be adapted to their environment in order to survive.

Materials

- Three Sisters Legend handout
- Corn seeds or seedlings
- Squash seeds
- Bean seeds
- Trowels
- Popsicle sticks
- Paint stirs and sharpies to label the beds
- Three Sisters Song sheet (optional)
- Seasonal tasting

Vocabulary

- Native American
- Three Sisters
- companion planting

Adapted from How Things Work, p. 280, and In the 3 Sisters Garden, p. 51.

Procedure: Day One

Opening Circle (15 minutes)

- *Has anyone here ever heard of the Three Sisters?* Solicit information on what students know about the Three Sisters.
- *Sometimes, we eat the Three Sisters, corn, beans, and squash, all together. But they are especially known for growing together in the garden. The Native Americans who lived here before were the ones who first knew how to plant the Three Sisters together.*
- *We are going to read a legend that the Native Americans told to explain their technique.*
- Pass out copies of Three Sisters Legend worksheet. Read it aloud as students follow along.
- Ask clarifying questions about which plant each sister represented and what happened in the story. *Why do the Three Sisters grow better together? How does the corn help the other sisters? What do the beans do? What does the squash do?*

Garden Job (25 minutes)

- *Today, we are going to plant the Three Sisters!*
- Put students in small groups of 3-4 people, with each group assigned to a mound. Have students first use trowels to dig holes to transplant the corn starts. Then, students can plant bean and squash seeds in the middle. Plant bean seed per corn plant, and one or two squash seeds per mound.
- If necessary, use popsicle sticks to mark on the mound where each start or seed should go.
- If time allows, students can label the beds using paint sticks and markers. Students can also add compost, mulch, or water their Three Sisters mounds.

Closing Circle (5 minutes)

- *Who can remind me who the Three Sisters are?*
- *How do the Three Sisters help one another?*
- Share out experiences from working in the garden.
- If time allows, teach the Three Sisters Song.

Procedure: Day Two

Opening Circle (5 minutes)

- *Who can remember what the three plants in the 3 Sisters legend are?*
- *Who can remember how these plants help each other? What does the corn do? What do the beans do? What does the squash do?*
- *Today, we are going to continue our work in the garden.*

Adapted from How Things Work, p. 280, and In the 3 Sisters Garden, p. 51.

Garden Job (25 minutes)

- If possible, do a garden job in the same beds where students planted the Three Sisters. Reference the lesson plans for watering, amending, or mulching.
- As another option, lead students in companion planting. Explain to students how the plants you have chosen help each other in the garden. Reference the lesson plans for planting seeds or transplanting for more specific information.

Closing Circle (15 minutes)

- *The Three Sisters not only show us a smart way to plant our garden, but they also remind us of the importance of helping one another out.*
- *Can you think of a time that someone helped you out?* Have students share in partners, then as a whole group.
- *Can you think of a time that you helped someone else out?* Have students share in partners, then as a whole group.
- Share a seasonal tasting.

Common Core State Standard Extensions

ELA, Grade 3, W2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

- You are the president of a Native American museum. You have an exhibit about Native American farming which shows a 3 sister garden. Write a caption for the exhibit that explains why the Native Americans planted this way. Make sure to explain what each of the "sisters" does for the other plants.
- Have the students design the exhibit as a poster or diorama.

Other Extensions

Math: Our class planted six Three Sisters mounds. In each mound, we planted 3 corn seeds. How many corn seeds did we plant? Each mound had 9 bean seeds. How many bean seeds did we plant? Each mound had 3 squash seeds. How many squash seeds did we plant? How many seeds did we plant in total?

Adapted from How Things Work, p. 280, and In the 3 Sisters Garden, p. 51.

The Legend of the Three Sisters

Native Americans who lived in the land we now call Brooklyn, New York, were known as the Lenape people. They were part of a larger tribe called the Algonquin Nation.

Like many other Native Americans, the Lenape got some of their food from hunting, some of their food from fishing, and some of their food from farming. Three crops that the Lenape grew and ate the most were known as the "Three Sisters." The Three Sisters were corn, beans and squash.

The Lenape Indians practiced what is called "companion planting." They grew their corn, beans and squash together in the same bed. It turns out the Lenape were smart to do this. The corn, beans and squash plants help one another grow. And corn, beans and squash, when eaten together, make a very healthy meal.

Many Native American tribes created legends to explain their history. There are many legends that explain how the three sisters—corn, beans and squash—started to grow together. Here is an adaptation that combines two traditional versions of the story, with some of our own twists.

Once upon a time there was a woman who had three daughters. All three daughters were beautiful and talented, but they were also very different. Like sisters sometimes do, they fought with one another all the time.

The oldest sister was very tall and strong and dressed herself in yellow. Because she was so big and strong, she had a big appetite and always needed more to eat.

The middle sister, who dressed in green, was tall but very thin and weak. She wanted to stand up straight to be near the sun, but she could not do so on her own. However, she was a very talented cook and knew how to prepare nutritious meals for her family.

The youngest sister was short and plump and liked to wear orange. She did not bother with trying to stand up straight—she was happiest crawling along on the ground. She also grew her fingernails very long and sharp.

The oldest sister would make fun of the middle sister for being weaker than she was. The middle sister would cry because she wanted to be big and strong. She would get back at her big sister by not giving her food even when she saw that she was hungry. The littlest sister, who wanted attention from both of them, would provoke her big sisters by sticking them with her prickly fingernails.

Adapted from How Things Work, p. 280, and In the 3 Sisters Garden, p. 51.

As a result, there was constant fighting among the three sisters, and their mother despaired. "How can I teach my daughters to care for one another instead of arguing all the time?" she wondered. She decided to leave the sisters together on a small hill for the day. "I am blessed with three daughters, each beautiful and talented in her own way," she told them. "But you fight so much that it breaks my heart. I am going to the woods to gather berries, and you three must stay here. While I am gone, I want you to figure out what is special and beautiful about each of you."

And so the mother left. At first, it was a disaster. The hill was very small and the sisters kept getting in each others' way. There were also bugs flying around the sisters, biting them and buzzing in their ears.

As the sisters were fighting among themselves, a crow flew by and watched with amusement. Now crows are known to be mischievous and play tricks, but this crow began to feel sorry for the sisters, so after a while she offered them her advice.

"I can see that you are very different from each other, and I can see that this causes you much disagreement. But differences can also be strengths. If you can figure out how, you will be rich with wisdom."

After the crow flew off, the sisters grew silent and thought about her advice. The oldest sister looked at her middle sister and for the first time understood how frustrated she must be trying to stand up straight. "Middle sister," she said, "why don't you wrap yourself around me. I can support you as you climb toward the sun."

The middle sister was surprised and also very grateful. She wound herself around her big sister and felt the warm sun on her face. "Thank you, big sister!" she exclaimed. "You seem very hungry. Would you like some of this food I have made?"

The generosity of the big sister was so inspiring, that the middle sister decided to pass it on. "There's also food for you, little sister," she said to the youngest sister who was crawling along the ground.

The two sisters accepted the food thankfully. And, with the big sister holding up the middle sister, there was more room for the youngest sister to crawl. This made her so happy that she decided to use her long fingernails to help her sisters by keeping the bugs away.

When the mother returned that day, she was overjoyed. The three sisters were chatting happily instead of fighting. Just as she had hoped, they had learned how to appreciate each other and all their differences.

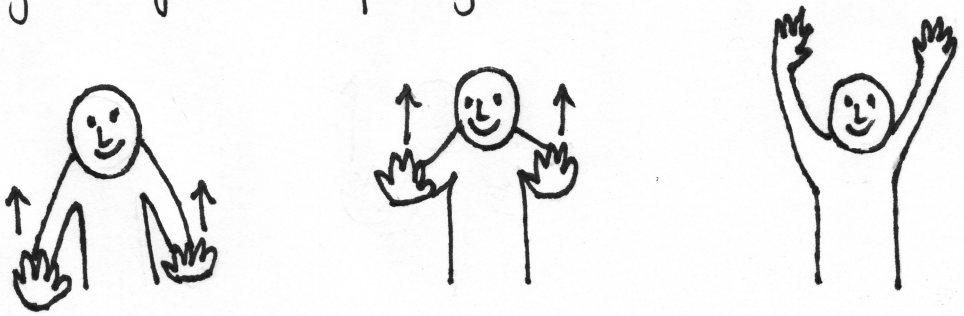
Adapted from How Things Work, p. 280, and In the 3 Sisters Garden, p. 51.

THREE SISTERS

A Song to the Tune of the Village People's "YMCA"

We're gonna grow some corn, beans, and squash!
We're gonna eat some corn, beans, and squash!

They've got everything that our bodies need



We're gonna grow them up from seed!

ESYNYC