

Science Songs



Songs written by Science Explosion – David Bydlowski, Charles Kline, and Fred Ribits

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Singing Science Songs

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For a website full of science songs, please visit: resa.net/sciencemusic

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Energy Flow – Sung to the tune of We Wish You a Merry Christmas (K-8)

Go With the Flow – Sung to the tune of London Bridges (5-8)

Home, Home, Habitat – Sung to the tune of Home on the Range (K-4)

Natures Way – Sung to the tune of Jingle Bells (K-4)

Owl Pellets – Lyrics and Chords Provided (K-12)

Relationships – Sung to the tune of Ten Little Indians (K-8)

Special Needs – Sung to the tune of Old MacDonald (K-4)

Waste Not – Sung to the tune of Swanee River (K-8)

Water Cycle – (K-8)



<p>Energy Flow</p> <p>On the bottom of the food pyramid, producers you will find Making food for all above; now isn't that kind? Consumers reach the peak, depending on their kind. Strongest carnivore on top with the others behind.</p> <p>The higher up a creature can get, The more energy it uses before it calls it quits. The scavengers down below, we need them to survive. They clean up all of the remains, or the garbage piles high.</p> <p>Next time you're walking through the woods, Take a look and you may see. As one thing eats another it transfers energy.</p>	<p>Go With the Flow</p> <p>Once upon a rainy day, water molecules at play. Falling down where they may and many reach the river. Then they go to Lake St. Clair, Lake St. Clair, Lake St. Clair. Then Lake Erie unaware of where their journey leads them.</p> <p>Down to Lake Ontario they will go, watch them flow. Then to the St. Lawrence River; their trip is almost over. They flow to the St. Lawrence Gulf, St. Lawrence Gulf, St. Lawrence Gulf. They flow through the St. Lawrence Gulf and to the Atlantic Ocean!</p>
<p>Home, Home, Habitat</p> <p>Now give me a home in a tree or a hole. But protect me wherever I'm at. From predators at play or a cold winters day. It's the place that I'm longing to stay.</p> <p>Home, home, habitat; the place that I hang my hat. When I leave and come back, I know right where it's at. It's where I lay down my welcome mat.</p>	<p>Nature's Way</p> <p>Carnivores eat meat; herbivores eat plants. Omnivores eat everything, like seeds and grass and ants. A predator hunts for food; calls its dinner prey. Scavengers clean up the mess; the bones are left to lay.</p> <p>Nature has its special way to guarantee success. It rids itself of all the weak and satisfies the rest. "Survival of the fittest" you often hear it called. It may sound cruel, but in the end it is the best for all!</p>
<p>Relationships</p> <p>In a food chain one thing eats the other. Food chains together, a food web you uncover. Producers and consumers help one another. Decomposers break down the food.</p> <p>Sometimes living things will benefit; This means they're sym...bi...ot...ic. Other relationships we fear the most, Parasites getting their food from hosts!</p>	<p>Special Needs</p> <p>Living things have special needs to help them stay alive. Certain things they have in life in order to survive. Water, air, food, and light, habitats, sheltered nights. These are all requirements for living things to thrive.</p> <p>Living things have special needs to help them stay alive. Aquariums and terrariums, they need things to survive. Water, air, food, and light, habitats, sheltered nights. These are all requirements for living things to thrive.</p>
<p>Waste Not!</p> <p>Humans can affect the environment In positive and negative ways. Reforestation and establishing parks And green space for kids to play.</p> <p>We must recycle household wastes And build water treatment plants. Not destroy animal habitats And learn how to manage our land.</p>	<p>Water Cycle!</p> <p>Rain and snow come down and they hit the ground, Soak into the Earth or they hang around. In puddles or lakes they evaporate Up into the clouds where they condensate.</p> <p>Boy it's cold up there, but they're unaware As they grab some dust and return to us. They precipitate on land and lakes. It's the water cycle: ain't it great? (Repeat)</p>

Owl Pellets

(Chorus)

C F G
Owl Pellets....Owl Pellets....Owl Pellets
C G C
A ball of bones and fur and other things

C
An owl must eat like you and me
F
It hunts all night when it can see
G
Using its claw to capture things
C
It moves about so silently

An owl looks for mice in trees and holes
F
If it gets lucky it will find a mole
G
It doesn't stop till it gets its fill
C
Then it spits up the undigested pill

Chorus

C
Remove the foil and you will see
F
An unknown blob with pointy things
G
Pick it apart and you will find
C
A big surprise waiting inside

Inside the pellet you will find its prey
F
Pick it apart throughout the day



G

Separate the bones from all the fur

C

Mix up with water and gently stir

Chorus

C

Check out the skeletal remains

F

Be careful not to wash them down the drain

G

Glue them together in figure form

C

To see what the owl last gobbled down

Now this may seem gruesome to you

F

You know the owl doesn't give a hoot

G

So please accept his apology

C

He did it for the sake of ecology

Chorus



Songs in service of science

by Kathryn Hoffmann

Has it ever happened to you? You're out shopping or walking down the hallway at school and you hear a few notes of a familiar tune wafting through the air. Before you know it, you find yourself singing along, surprised to find that you know all the words of a popular advertising jingle or the theme of a TV show. Creating a song that is recognizable and easily learned to market a product or show is a technique used by Madison Avenue and Hollywood. Without conscious effort, viewers learn facts about the characters in a series (as in the opening theme songs of *The Brady Bunch* and *Gilligan's Island*) and consumers associate a certain product with a particular manufacturer (e.g., Oscar Mayer wieners or bologna). As a child, I sang along with country-western singer Johnny Horton that "in 1814, we took a little trip along with Colonel Jackson down the mighty Mississippi," only to discover years later that I had memorized the key facts about the Battle of New Orleans from the War of 1812. This same technique can be used to teach vocabulary and key facts for a variety of science topics.

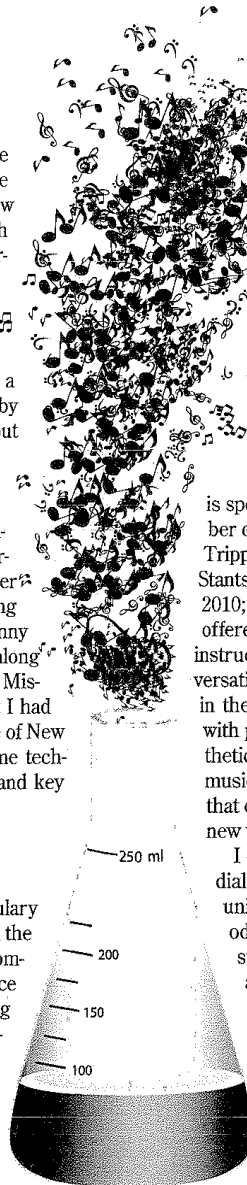
Science-specific songs

Understanding the specialized vocabulary used by scientists to describe and explain the world is crucial to students' ability to comprehend and learn from nonfiction science texts and to be successful in mastering more advanced topics. Yet a high percentage of the vocabulary words used in science are multisyllabic and have unfamiliar Latin or Greek roots that are unrelated to common, everyday English or to the vocabulary of fiction learned in

language arts classes. Research has shown that explicit instruction of key vocabulary terms is one of the most effective ways of improving academic achievement (Marzano 2010; Marzano, Pickering, and Pollock 2004) and is especially important for English language learners and students with limited background knowledge of the content being taught. For example, children who have never seen the ocean will struggle with understanding tides unless the missing foundational knowledge is specifically supplied (Marzano 2004). A number of recent articles in *Science Scope* (Jackson, Tripp, and Cox 2011; Leno and Dougherty 2007; Stants 2013) and *The Science Teacher* (DeLuca 2010; Shook, Hazelkorn, and Lozano 2011) have offered various ideas for improving vocabulary instruction. This article hopes to add a new and versatile tool to that group. Incorporating music in the instruction of vocabulary helps students with pronunciation, benefits auditory and kinesthetic learners (as they tap out the beat of the music or rap), and provides an element of fun that can overcome student resistance to drilling new vocabulary.

I developed many of these songs as a remedial action after reviewing student scores on a unit test and realizing that my regular methods of teaching vocabulary had failed some students. I created some songs to address a particular area of confusion or misconception that was revealed during class or assessments. Later, I realized that these songs could be useful tools to avoid difficulties when introduced at the beginning of instruction.

My first foray into songwriting arose from the difficulty several of my stu-



dents were having remembering which atomic particles form the nucleus. I took advantage of the natural rhythm of the words *neutron*, *proton*, and *electron* to create a simple rap (Figure 1a) to help them remember. I began by teaching students to recite the first part of the round. Then, as the class continued to repeat it, I added the second part, accompanying it with a hand motion to show an electron orbiting a nucleus (using the finger of one hand to trace a circle in the air around the closed fist of my other hand). I then took a moment to explain the significance of the motion and the words. Finally, I divided up the class in several different ways (girls versus boys, first rows against back rows, etc.) to continue our practice. Once students had learned the song, I made a point in future classes to review it each time someone put the wrong particle in the nucleus during question-and-answer periods. Like with any method, the key to learning is repetition.

One day, as students were reading a section of the textbook out loud in class, I observed that a number of students skipped over unfamiliar words as they read. Even when I pronounced the word for them, they refused to repeat it after me and just reread the sentence without the missing word. This opened my eyes to one reason why students have difficulty learning such words: Because they were unable or unwilling to break down the word into familiar units (individual letters or stems and roots), there was nothing for their brain to remember. One such difficult word was the cell organelle *endoplasmic reticulum*. I realized that if I matched the syllables of the unfamiliar word to the beats of a verse in a song, I could help students learn this vocabulary.

Since we were working on this topic in December, I adapted the words to fit a well-known Christmas carol, "The Twelve Days of Christmas." Endoplasmic reticulum became "five golden rings" (see Figure 1b). Students stopped skipping the term when reading, and as we learned about additional cell organelles, we added new verses to the song. Eventually, the song included 12 different terms (the song can be shortened [Figure 1c] if a simpler version of the cell and its organelles is taught). Each student was given a copy of the song to keep and use for review. As in the previous case, I used mistakes made in class as opportunities to practice the vocabulary by singing the song, pointing out to students how the verses linked the organelles with their function.

A good song uses a catchy and familiar tune to target a specific instructional goal and often provides a useful tool for memorization. In addition to introducing or practicing vocabulary, it can also be used as a mne-

monic for mastering a series of terms in the correct order. I have used it successfully to improve student performance in learning the order of the planets (Figure 1d) and the levels used in the Linnaean system of classification (Figure 1e). For example, when a group of sixth graders was asked to list the planets of the solar system in order, the majority (62%) could not name all of the planets. An additional third (31%) could name the planets but did not know the correct order. Only one student (7%) was able to write the correct names in the correct order. After instruction that included a song (Figure 1d), 75% were able to write out all of the planets in the correct order. The remaining 25% had the correct order but were missing one planet. A class of eighth-grade students had 100% retention of the correct order of the Linnaean levels after instruction that included the names put to music (Figure 1e).

Songs can also be used to purposefully compare and contrast similar terms that often cause confusion. One such song discusses the characteristics of mitosis versus meiosis in two verses set to the same tune (Figure 1f); another (Figure 1d) compares rotation to revolution. Two separate songs (Figure 1g and 1h) were used to help students understand the characteristics of photosynthesis and cellular respiration and the relationship between them. Each can be used on its own if only one topic is taught, or they can be used together as needed.

Songs are most effective when combined with another method that reinforces the concept being taught. For example, when teaching photosynthesis or respiration, students can sing the song to help them as they label a diagram or create a freehand illustration of the process. Combining a song with labeling a diagram is also a useful technique for mastering the differences among radiation, conduction, and convection (Figure 1i). Having students do this also gives the teacher an informal assessment of student learning along the way.

Songs such as these are sometimes "adopted" by students and take on a life of their own that goes beyond the classroom. For example, I discovered a group of my sixth graders singing the photosynthesis song as they headed out to their buses after school. My seventh-grade class gave a concert of one song to eighth-grade students, who returned the favor the next week with a song they were learning on a different topic. Each class adds its own "signature" to a song, developing a unique combination of voices and hand taps and foot stomps to accompany it, which adds to students' sense of ownership and pride in the song and contributes to their mastery and retention.

TRIED AND TRUE

Conclusion

A good song is fun and memorable, using music to match the natural rhythm of words and to weave them into a simple definition or description. It may be used for a variety of academic goals including targeting new vocabulary, learning an ordered list of terms, or untangling similar ideas that are easily confused. As such, it is a useful tool in a teacher's toolkit and forms part of a larger complex of activities that work to communicate knowledge. It can be used during the beginning of a lesson to pique interest and jump-start the learning process, later in the lesson as a means to practice and reinforce the use of new vocabulary, or toward the end of a lesson as a means of review for an assessment or for remediation of lingering difficulties. ■

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FIGURE 1 Songs

a. Song to teach particles of the atom

"Atomic Rap"

First group: "PRO-tions" X "(and) NEU-trons" X "(in the) NU-cleus" X "(of the) A-tom" XX.

Students in the first group chant this line, clapping a regular beat that falls on each capitalized syllable and on each "X." Capitalized syllables are accentuated. Words in parentheses are pickup notes.

Second group: "Electrons orbit all around."

Students in the second group recite their phrase on a single note while walking around the seated group of students, or students in the second group can do the motion of tracing a circle in the air around their fist while chanting their line.

b. Long version of a song to teach about cell organelles

"The Parts of a Plant Cell"

(sung to the tune of "The Twelve Days of Christmas")

When I look inside a plant cell,
I see so many things...
(1st day)...a **cell wall** and **membrane** all around,
(2nd day)...**cytoplasm** everywhere and
(3rd day)...**vacuoles** for storage,
(4th day) **chloroplasts** make sugar,
(5th day)...**en-do-plas-mic re-ti-cu-lum**...and
(6th day)...protein-making **ribosomes**,
(7th day)...**lysosomes** for waste,
(8th day)...**Golgi bodies** package things...
(9th and 10th days are sung together)
...many **mitochondria** for cellular respiration
[Spoken after sung verse: "They make energy!"]
(11th and 12th days are sung together)
A **nucleus** and **chromosomes** with genetic information...

c. Shortened version of the song to teach about cell organelles

"The Parts of a Plant Cell"
(sung to the tune of "The Twelve Days of Christmas")

When I look inside a plant cell,
I see so many things...

(1st day)...a **cell wall** and **membrane** all around,
(2nd day)...**cytoplasm** everywhere and
(3rd day)...**vacuoles** for storage,
(4th day)...**chloroplasts** make sugar,
(5th day)...**en-do-plas-mic re-ti-cu-lum**...and
(6th day)...protein-making **ribosomes**,
(7th day)...**mitochondria** for energy

(8th and 9th days are sung together)
A **nucleus** and **chromosomes** with genetic
information...

d. Song to teach planets of the solar system and compare rotation to revolution

"The Solar System Song"
(sung to the tune of "The Wheels of the Bus Go Round and Round")

Mercury, Venus, next comes Earth,
Mars is fourth, then the asteroids,
Jupiter, Saturn, U-ra-nus,
Neptune and the Kuiper belt [yeah, Pluto].

Rotation spins a planet 'round
On its axis, round and round.
Rotation spins a planet 'round
To make day and night.

A revolution of a planet,
'Round the Sun, round the Sun
A revolution of a planet
Makes one year.

e. Song to teach names of Linnaean levels of classification

"The Linnaean Levels of Classification"
(sung to the tune of "Frère Jacques"/"Brother John")

Kingdom, phylum, class, and order
Family, family
Do you know who I am? Do you know who I am?
Genus and species, genus and species.

f. Song (in two parts) to teach the basic differences between mitosis and meiosis

"Meiosis Song"
(sung to the tune of "Drunken Sailor")

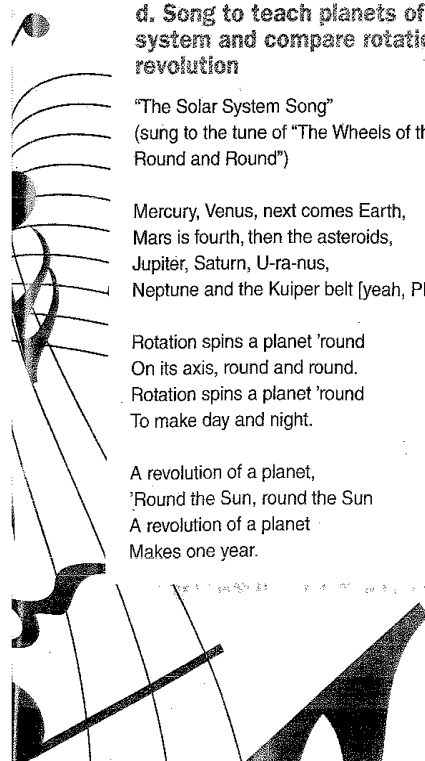
What do you do to make some gametes?
What can you do to make cells haploid?
What if you want to make them different?
Make them with meiosis!

Meiosis halves the chromosomes,
Meiosis makes our sex cells,
Duplicate, pair up, divide, and divide again,
One cell makes four with meiosis!

"Mitosis Song"
(sung to the tune of "Drunken Sailor")

What do you do when you need a new cell?
What can you do to make it identical?
How do you keep the same number of
chromosomes?
Make it with mitosis!

Duplicate, align, and divide for mitosis,
Amoebas, bacteria, and body cells all do it,
Duplicate, align, and divide the chromosomes.
One cell makes two with mitosis!



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FIGURE 1 Songs (continued)

g. Song to teach the basics of photosynthesis

"Photosynthesis Song"
(sung to the tune of "Frère Jacques"/"Brother John")

Photosynthesis, photosynthesis,
How is it done? How is it done?
Take carbon dioxide,
Water, and some bright light,
Mix it with chlorophyll, mix it with chlorophyll.

Photosynthesis, photosynthesis
What does it make? What does it make?
Glucose and oxygen,
That's sugar and oxygen,
For us to eat and breathe, for us to eat and breathe.

Respiration, respiration,
It's the reverse, it's the reverse,
Thus the cycle goes around
That's the way the world goes 'round
Photosynthesis and respiration.

h. Song to teach the basics of respiration

"Cellular Respiration"
(sung to the tune of "Twinkle, Twinkle, Little Star")

Respiration makes energy for cells,
My cells, your cells, animal and plant cells,
What do you need?
Oxygen to breathe,
Glucose from
The food that you eat,
Then jump and run and have a lot of fun
With the energy when respiration's done!

Respiration makes energy for cells,
By breaking down sugar in the food you eat.
When you breathe in
You take in oxygen.
When you breathe out,
It's carbon dioxide.
And don't forget, you breathe out water, too.
You help a plant and a plant helps you.

i. Song to teach the three types of transfer of thermal energy: radiation, conduction, and convection

"Energy Transfer Song"
(Sung to an adaptation of the theme song of "Green Acres"*)

Ra-di-a-tion transmits energy.
Radiation doesn't need molecules.
U-sing e-lec-tro-mag-ne-tic waves,
It makes you feel the fire's heat and get sunburned.

I love convection 'cause it makes me move.
I'm a molecule that's on the go.
Up and down, and all around, from here to there,
Convection currents move the heat in water and in air.

With conduction, if you're next to me,
Molecule to molecule, I'll share my energy.
Conduction transfers heat in a solid like a pot.
When the bottom's on the fire, it makes the handle hot.

* If students are unfamiliar with the theme song of this TV show, the original version of the opening song can be found on YouTube.

