

# Move Like a Radical

3-5

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## Objectives

### Students will be able to:

- Identify benefits of being physically active.
- Explain the influence of nutrition and physical activity on health.

## Standards Met

- **5-LS1:C.** Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)
- Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

## Overview of Physical Activity

**Did you know?** Playing sports is not the only thing that counts as being active. Other types of physical activity include biking, walking, playing games like tag, taking the stairs, doing chores, gardening, dancing, and more.

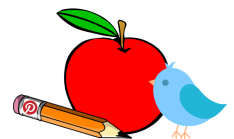
Physical activity involves any body movement that uses energy. Being physically active provides many benefits to our health: it helps maintain a healthy body weight; it strengthens our bones and muscles; it improves our mood and mental health; it reduces risks of developing chronic diseases like heart disease, diabetes and even cancer; and it increases our chances of living a longer life. General physical activity guidelines recommend 60 minutes of physical activity a day for children and 150 minutes a week for adults.

In order to achieve these goals, the **Healthy People 2020** guidelines recommend:

- Increase regularly scheduled elementary school recess in the United States
- Limit screen time (television, videos and video games) to 2 hours a day
- Increase the proportion of trips made by walking
- Increase the proportion of trips made by bicycling

**For more information on physical activity, go to:**

[www.mentorprojectfiu.com](http://www.mentorprojectfiu.com)



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# Make The Connection

## Materials

- Activity: “Move Like a Radical” for Grades 3-5
- Supplemental Material: “Free Radicals and Antioxidants”
- Flag Football Belts

Using the activity titled “**Move Like a Radical**” for Grades 3-5, help students incorporate physical activity while they learn the effects of free radicals and antioxidants in the body.

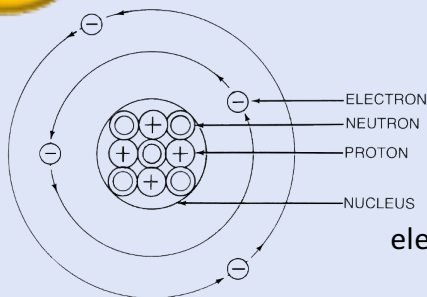
Engage your students by talking about physical activity. Ask their opinion on what it means to be physically active and what benefits it provides. Emphasize that being active not only helps the body stay healthy and become stronger, but it also makes you feel happy. There are many different ways to be physically active and it never has to be boring.

**REMEMBER**, children should participate in 60 minutes of physical activity every day. For more information on, visit: [www.mentorprojectfiu.com](http://www.mentorprojectfiu.com)

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After discussing the benefits of physical activity, talk to your students about free radicals and antioxidants. Refer to the supplemental material titled “Free Radicals and Antioxidants” for a detailed explanation.

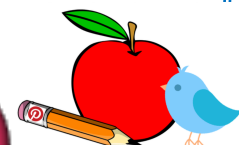


Draw the structure of an atom on a board and show the students where the electrons are situated. Explain that atoms get together and create molecules, and these molecules make up all the cells in our bodies. Happy, stable molecules have their outer shell full of paired electrons, but sometimes, molecules will lose one electron and the outer shell remains with one unpaired electron. When this happens, the molecule becomes a “free radical.”

Free radicals try to become stable and happy again by stealing an electron from another molecule. However, this causes a chain reaction of free radicals and these molecules can eventually damage the cell they are in. Too much damage from free radicals can make the body sick. Environmental factors like pollution, smoking, and an unbalanced diet can create free radicals in the body. Luckily, eating a balanced diet full of fruits and vegetables provides the body with vitamins and minerals that can help fight free radicals. These free radical fighting molecules are known as “antioxidants” and they help protect the body from damage caused by free radicals.

Lastly, incorporate both lessons by introducing the activity “**Move Like a Radical**” for Grades 3-5 and encourage learning by incorporating physical activity!

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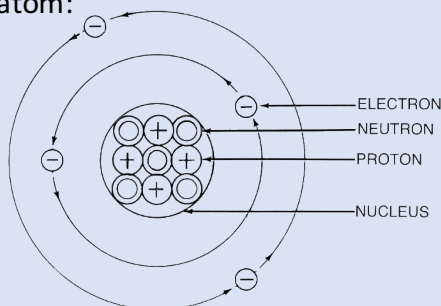
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# Supplemental Material

## For the Teacher: Free Radicals and Antioxidants

### Things to remember:

- Atoms are made up of a nucleus, neutrons, protons and electrons.
- Electrons orbit an atom in one or more shells, and the electrons on the outer most shell can be shared, lost, or gained to make molecules and other chemical reactions.
- Atoms with a full outer shell are most stable.
- Diagram of an atom:



Free radicals are molecules that have an odd number of electrons in their outer shell, meaning that there is one electron in the outer shell that is unpaired. This unpaired electron causes the molecule to become unstable, because its outer shell is not full, and the molecule will try to find an electron by stealing one from the closest stable molecule. Once the free radical takes the electron and becomes stable, the molecule that lost the electron now becomes a free radical itself and searches out the nearest electron to steal, creating a chemical chain reaction of free radicals. If this chain reaction continues with nothing to stop it, it will eventually create a free radical from a molecule that cannot function without the lost electron, and the cell that holds this molecule will become defective. If too much of this happens, then the body becomes susceptible to disease and ages faster.

Free radicals can be naturally formed during many of the body's chemical processes and can even be used as "bombs" by the body's immune system to kill viruses and bacteria. However, many environmental factors like pollution, UV exposure, cigarette smoke and an unbalanced diet low in fruits and vegetables can also cause free radicals to be created.

Luckily, a balanced diet, high in fruits and vegetables, helps keep the production of free radicals in check. Fruits and vegetables provide many vitamins and minerals, and some of these micronutrients can act as antioxidants in the body. This antioxidant property is what helps protect the body against free radical damage. Antioxidants defuse free radicals by donating one of their own electrons and creating happy partnerships instead of stealing frenzies. Some vitamins and minerals with potential antioxidant activity are vitamin C, vitamin E, and Beta-Carotene.

- ★ It is important to note that while antioxidant activity may be beneficial to health, having too much antioxidant activity could also have negative effects. Therefore, it is important to talk to your doctor before starting any supplementation of these vitamins.



# Move Like a Radical

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## INSTRUCTIONS

### Roles:

**Students:** stable molecules, free radicals, antioxidants

**Teacher:** Environmental forces, fruits and vegetables

### **Belts (two different colors):**

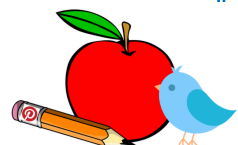
**(2 belts on)** = paired electrons in outer shell (stable molecule)

**(1 belt on)** = unpaired electron in outer shell (free radical)

**(no belt)** = antioxidant

- 1) Have all but five of the students put on two (2) flag football belts of different colors. These belts represent the paired electrons in the molecule's (student) outer shell. All of the students will start out as a happy, stable molecule, except the five students that have no belts. These five students will be antioxidants and will stay out of the game until later.
- 2) Let the happy, stable molecules walk and dance\* around the room. Then, environmental forces (teacher), like unbalanced diet and pollution, will strike a stable molecule and turn it into a free radical by taking one of the colored flags (electron).
- 3) Once the molecule (student) loses their electron, they are now a free radical and must try to take a new electron (flag of the same color lost) from one of the stable molecules. The free radical must try to take the electron while doing wacky jacks\*. Once the stable molecule loses their electron and becomes a free radical, it must steal a new electron, and so on.

\*Movement references for this activity are provided after the instructions.



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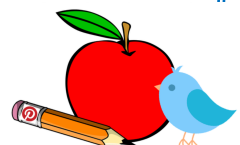
## INSTRUCTIONS CONTINUED

- 4) To emphasize the potential harm of too many free radicals, let environmental factors affect more stable molecules throughout the game.
- 5) Once there's a lot of free radicals (about 7 or 8), provide the molecules with antioxidants (students with no belts) from vitamins and minerals found in fruits and veggies. Antioxidants will approach free radicals by doing walking lunges\* and stabilize the radical by giving them a belt and holding their hand. Together they become a happy, stable, dancing\* molecule again.

**NOTE:** Antioxidants will have no belts on themselves, but will carry a belt (electron) in their hands that they will give to the free radicals to stabilize.

- 4) During the game, engage students by asking questions about what they are doing and how the activity represents the effect free radicals and antioxidants have in the body.

\*Movement references for this activity are provided after the instructions.



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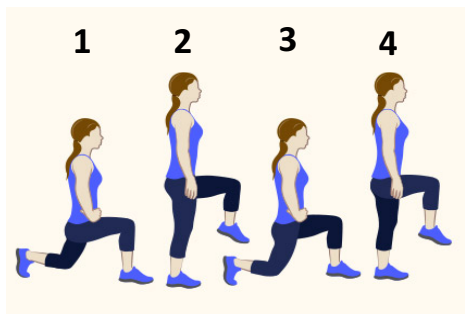
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## MOVEMENT REFERENCE SHEET

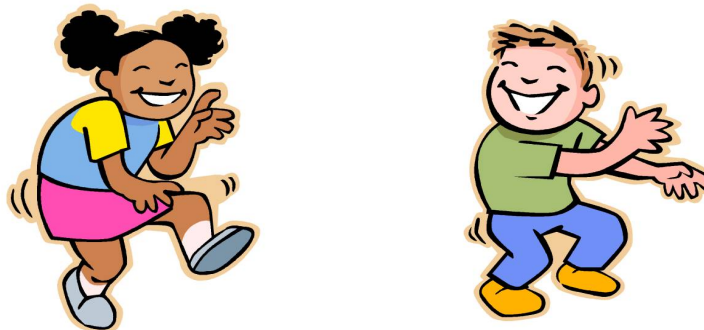
**Wacky Jacks (free radical movement):**



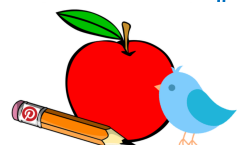
**Walking Lunge (Antioxidant movement):**



**Stable Molecule Dance:**



\*Antioxidant-Free radical pairs will dance while holding hands\*



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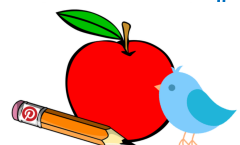
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# Move Like a Radical

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## QUESTIONS

- 1) Why is it good to be physically active in your everyday lives?
- 2) Why is this game considered physical activity?
- 3) How can you incorporate physical activity in your other classes?
- 4) Why can it be harmful to have too many free radicals?
- 5) How do antioxidants help the body?
- 6) Where can you get antioxidants in your diet?
- 7) What makes a stable, happy molecule?
- 8) What makes a free radical?
- 9) How does a balanced diet and physical activity make you healthy?
- 10) What have you learned today?



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# Move Like a Radical

## ANSWER KEY

### QUESTIONS

3-5

- 1) **Why is it good to be physically active in your everyday lives?**

Because physical activity keeps the body healthy and strong, and even makes you happy.

- 2) **Why is this game considered physical activity?**

Because everyone is moving their body and having fun.

- 3) **How can you add physical activity in your life everyday?**

By playing with friends, doing chores, and walking the dog.

- 4) **Why can it be harmful to have too many free radicals?**

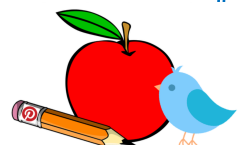
They can damage cells and cause disease.

- 5) **How do antioxidants help the body?**

Antioxidants help control free radicals so that they do not cause too much damage.

- 6) **Where can you get antioxidants in your diet?**

Fruits and vegetables.



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## ANSWER KEY

### QUESTIONS

- 7) **What makes a stable, happy molecule?**  
Having all of their electrons.
- 8) **What makes a free radical?**  
Molecules that are missing an electron.
- 9) **How does a balanced diet and physical activity make you healthy?**  
A balanced diet gives you all the nutrients and energy you need and physical activity gives your body the exercise it needs to be healthy.
- 10) **What have you learned today?**  
Any answer is valid.

