



Leafy Greens Council Lesson Plans

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Instructor Introduction

SUBJECT AREA: Language Arts, Math, Science/Health, Social Studies

GRADE LEVEL: Grades 3 - 5

SUMMARY: Students are led through activities across the core curriculum by a team of five dinosaur characters dressed in baseball uniforms who are the "Cruciferous Crusaders" All-Star Cancer Fighting Baseball Team. (Cruciferous = vegetables in the leafy green family).

OBJECTIVES:

1. Students will understand nutritional benefits of cruciferous vegetables.
2. Students will understand cancer-fighting elements in cruciferous vegetables.
3. Students will encourage the increase in consumption of leafy greens at home.

Introduce students by asking them why food is important to us (to help us grow, be strong, be healthy, and have energy for school and play). Refer to the Food Guide Pyramid. Most people do not eat enough from the vegetable group. Ask students to name vegetables they ate yesterday. Explain that cabbage, lettuce (all varieties), broccoli, kale, and spinach are vegetables that are very good for you and can be prepared in different ways so they taste great!

According to Dr. Wendy Demark at the Duke Comprehensive Cancer Center, diet plays a big role in cancer prevention. It is estimated that over one third of all cancer-related deaths could be prevented by a healthy diet. Fruits and vegetables are key. Research suggests that people who eat at least 5 servings of fruits and vegetables per day cut their cancer risk in half when compared to those who consume one serving or less. Vegetables are especially nutrient dense. Calorie for calorie they pack more vitamins, minerals, fiber, and other cancer fighting agents than any other food group. Cabbage family (cruciferous) vegetables are particularly powerful cancer fighters.

The following lesson plan activities offer many ideas for teachers to adapt within their grade level core curriculum. A student portfolio master begins the collection of opportunities for new learning experiences. Possible community and parental involvement offer variety to the everyday lessons. Fun in the classroom is a guarantee as well as the reward of contributing to a child's healthy nutritional habits for a lifetime. A grand culminating activity, test item bank, answer keys, additional free informational package order form, and sources at conclusion of lesson plan.



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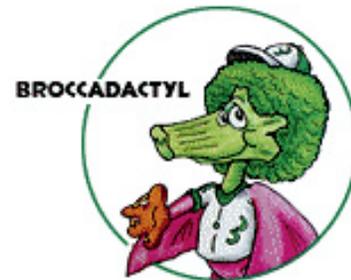
Student Introduction



Hi, Boys and Girls! My name is **Cabbagesaurus** and I am the team captain of the All-Star Cancer Fighting Team -- the **CRUCIFEROUS CRUSADERS**. My strength is in the high mineral and vitamin content which you can get from cabbage. **CRUCIFEROUS** is a big word that stands for the leafy green vegetables, cabbage, spinach, broccoli, kale, red and green lettuce. Our team is very important because we can help you have a healthy diet, AND we can help you lower the risk of certain types of cancer.

Let me introduce to you the other members of our All-Star Team:

First is our pitcher, **Broccadactyl**. He has helped carry the **CRUSADERS** to world championship because his power source is the fiber which comes from broccoli.



May I introduce the Red and Green **Lettuceratops**. They play 1st and 2nd base. The healthy, low calorie content of lettuce makes them a team favorite.

Our right fielder is the fantastic **Kal-O-Don**. He is a versatile team player and has lots of calcium from kale which gives him his strong right arm.



And say hello to **Spinachraptor**. He is our power hitter. He is known throughout the world for the power that comes from spinach.

Altogether, the mighty **CRUCIFEROUS CRUSADERS** Team can help you have a healthy body and fight cancer. So, won't you join our team and be on your way to better health?



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Language Arts #1

Have students read "Student Introduction" introducing the Cruciferous Crusaders, discussing the benefits of eating leafy green vegetables (better health, preventing cancer).

OBJECTIVES: Students will develop reading comprehension skills while learning the nutritional benefits of cruciferous vegetables.

Now, we're going to throw you a few "pitches". See how many you can hit. Put your score in the box provided.



Answer Key

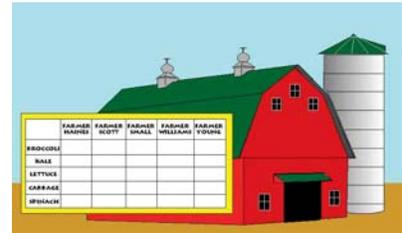
- | | | |
|----------------|------------|------------|
| 1. Cruciferous | 3. Calcium | 5. Spinach |
| 2. Broccoli | 4. Lettuce | 6. Cancer |

Language Arts #2: WHO GROWS CABBAGE?

OBJECTIVE: Students will develop logical thinking skills.

DIRECTIONS:

- Getting Started: (0 = Grows it, X = Does not grow it)
- Read the first fact. Mark a large 0 under Farmer Scott's name beside the vegetable he grows (Kale).
- BEFORE YOU GO TO FACT #2, put a large X under Farmer Scott's name beside all the vegetables he does not grow (broccoli, lettuce, cabbage, and spinach).
- EACH FARMER GROWS ONLY ONE CROP, so put a large X in each appropriate box under the other farmer's names to show that they do not grow the vegetable Farmer Scott grows (Kale).
- Now you have marks under all five farmer's names showing if they grow kale.
- Now you're ready to do the same for Fact #2. Have Fun!



Answer Key: Farmer Haines

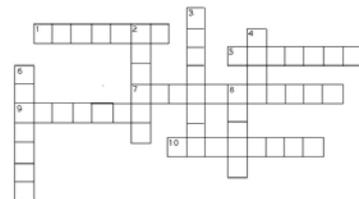
Language Arts #3: CRUCIFEROUS CRUSADERS CROSSWORD PUZZLE

Use these words to fill in your Cruciferous Crusaders Crossword:

KALE
CRUCIFEROUS
BROCCOLI
LETTUCE

SPINACH
CABBAGE
FIBER
MINERALS

CANCER
CALORIE



Answer Key

- | | | | |
|-------------|------------|----------------|--------------|
| 1. Spinach | 4. Kale | 7. Cruciferous | 10. Minerals |
| 2. Cancer | 5. Cabbage | 8. Fiber | |
| 3. Broccoli | 6. Calorie | 9. Lettuce | |



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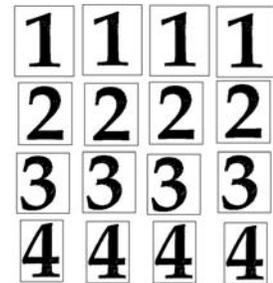


Language Arts #4: ALL-STAR HEALTHY EATING HABITS

OBJECTIVE: Students will recognize healthy foods

DIRECTIONS:

1. Divide the class into groups of five or six students per group.
2. Copy one game board for each group of students. Color and laminate, if desired.
3. Cut out numbers and put in a "hat".
4. Teacher allows student from Group 1 to pull number out of "hat". Group 1 students proceed to appropriate square and follow directions if they land on a non-leafy green food. If they land on a healthy leafy green, they stay there until their next turn.
5. Teacher proceeds to other groups and follows same procedure for Groups 2, 3, and 4; letting a different student from each group draw each time.
6. The first group to get back to START square wins.



Language Arts #5: LEAFY GREENS BINGO

OBJECTIVE: Students will recognize words connected with leafy greens lessons.

DIRECTIONS:

1. Hand out one Bingo card and one word list per student.
2. Have students copy words in random order onto the Bingo card so that no two students' cards are exactly the same.
3. Play "Bingo" by the teacher calling out one word at a time and students circling the word as they find it.
4. Winner will be the first student who circles five in a row, either vertically, horizontally, or diagonally. Remember to circle the free space in the center of the card!



LEAFY GREENS BINGO WORD LIST

- Broccoli
- Kale-O-Don
- Vitamin C
- Spinach
- All-Star Team
- Fiber
- Leafy greens
- Kale
- Low calorie
- Green lettuce
- Cruciferous
- Spinachraptor
- Broccadactyl
- Minerals
- Calcium
- Cabbage
- Lettuceratops
- Red lettuce
- Cabbagesaurus
- Healthy
- Cancer fighting
- Crusaders
- Vitamin B1
- Vegetables



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Math #1: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of addition or subtraction of 1, 2, or 3 digit numbers.

TEACHER SUGGESTIONS:

- Bring baseball bat, baseball, and glove into classroom.
- Let students cut out magazine pictures from old sports magazines of baseball park related pictures.



Answer Key:

- | | |
|---|---------------------|
| 1. 16 items | 7. 5 drinks |
| 2. 12 hot dogs | 8. 16 students |
| 3. Afternoon: 13 items; evening: 13 items | 9. 9 drinks |
| 4. 62 students | 10. 123 more seats |
| 5. 248 people | 11. 91 tickets left |
| 6. 80 baseballs | 12. Hannah |

Math #2: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of addition/subtraction of money; counting change.

TEACHER SUGGESTIONS: Set up a tour of a local grocery store. With parent helpers, have students compare prices of leafy greens with other foods. Discuss changes in technology by weighing cabbage on hanging scales, then on computerized scales at register. Figure costs by weight x price per pound.

Answer Key:

- | | | |
|--|--|---------------------------|
| 1. Justin, because same product less expensive | 4. Justin - \$18.00 and Jess - \$16.00 | 7. \$2.05; needs .95 more |
| 2. Her brother | 5. \$4.05 | 8. \$4.50 |
| 3. \$9.00 | 6. \$1.45 is not enough | 9. \$5.00 |
| | | 10. \$5.50 |

Math #3: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of tables and organization of data.

TEACHER SUGGESTIONS: Expose students to computer database. Ask parent volunteers to help students track their daily intake of vegetables on a class database.

Answer Key: 1. Broccoli bites, 11, Ice cream, 13 more, 15 fewer, 72 items



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Math #4: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of multiplication.

TEACHER SUGGESTIONS: Show students standard $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and 1 cup measuring cups and discuss measurements. Challenge students to correctly measure rice, popcorn kernels, or other dry ingredient.

Answer Key:

- | | |
|-----------------|-----------------------|
| 1. 12 Bags | 5. 6 candy apples |
| 2. \$60.00 | 6. 24 balls in 3 days |
| 3. 14 boxes | 7. 12 broccoli bites |
| 4. 16 feet wide | 8. 36 laps |

Math #5: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of division and fractions.

TEACHER SUGGESTIONS: Show students standard $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and 1 cup measuring cups and discuss measurements. Challenge students to correctly measure rice, popcorn kernels, or other dry ingredient.

Answer Key:

- | | |
|--------------------------------------|------------------------|
| 1. 8 games | 6. 126 students |
| 2. 6 pieces of hot dog | 7. 18 fans on each row |
| 3. 6 baseball cards for each student | 8. 7 |
| 4. 8 boxes on each shelf | 9. 11 |
| 5. 3 games | 10. 5 |

Math #6: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of mixed applications, estimates, and time.

TEACHER SUGGESTIONS: Have students demonstrate the ability to measure by showing $\frac{1}{4}$, $\frac{1}{2}$, and 1 cup of leafy greens, raw and/or cooked. Show how two $\frac{1}{4}$ cups equal $\frac{1}{2}$ cup, etc. Relate measurements of greens according to the Food Guide Pyramid: children need 4 servings per day: 1 serving = 1 cup of leafy raw veg or $\frac{1}{2}$ cup of chopped raw or cooked veg.

Answer Key:

- | | |
|----------------------------|-------------------------|
| 1. Justin - 10, Hannah - 6 | 6. 10 dimes, 8 quarters |
| 2. 5 | 7. 61 |
| 3. \$3.50 | 8. \$31.50 |
| 4. 300 lbs. | 9. 30 minutes |
| 5. 50 miles | 10. 2:15 pm |



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Math #7: PROBLEMS AT THE BALLPARK

OBJECTIVES: Student will reinforce understanding of logical thinking in problem solving.

TEACHER SUGGESTIONS: Have students measure 18" x 12" poster board and cut out "placemat" to decorate, laminate, and use in the classroom for parent lunch culminating activity, then take home.

Answer Key:

- | | |
|--|--|
| 1. 13 | 5. Diamond |
| 2. 3 games | 6. Answers will vary |
| 3. 3 seats behind Kate | 7. 4 red uniforms |
| 4. 5 cones (2 chocolate, 2 strawberry, or 1 vanilla and 1 chocolate) | 8. Drinks, broccoli bites, hot dogs, popcorn, candy apples |

Math #8: CABBAGESAURUS COLOR BY NUMBER

COLOR BY NUMBER



- | | |
|----------------|-----------------|
| 1 • GRAY | 4 • LIGHT GREEN |
| 2 • GREEN | 5 • DARK GREEN |
| 3 • LIGHT BLUE | 6 • PINK |



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Social Studies #1: CRUCIFEROUS CRUSADERS CONNECTION

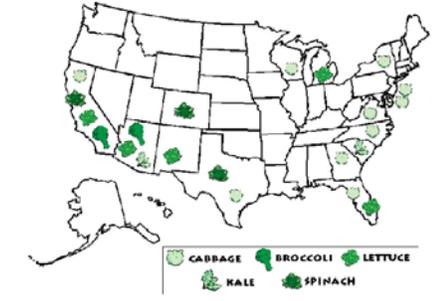
OBJECTIVES: Students will recognize where leafy green vegetables are grown in the United States.

MATERIALS NEEDED:

1. Cruciferous Crusaders Connection sheet for each student.
2. Crayons or colored pencils.
3. Gold star for each student.

DIRECTIONS:

1. Hand out Connection sheets, crayons, and gold stars.
2. Read and discuss paragraph below.
3. Read and follow directions for statements A through E.



FOLLOW-UP ACTIVITY:

On a large map of the United States, have students follow same directions as on sheet, but use colored yarn to trace route of vegetables.

Social Studies #2: ORIGIN OF LEAFY GREEN VEGETABLES

OBJECTIVES: Students will realize the origin of leafy green vegetables.

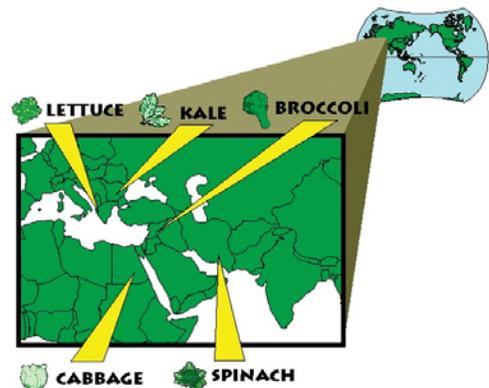
CABBAGE: One of the oldest vegetables, has been in cultivation for over 4,000 years. Like many Americans, it had its origin in foreign lands. The common cabbage and related varieties were probably all developed from a wild cabbage native to the coast of Europe. It is believed cabbage was domesticated in the Eastern Mediterranean region.

BROCCOLI: Broccoli originated about 2500 years ago from the wild cabbage common in coastal Europe.

LETTUCE: It is believed that lettuce originally was native to Europe and Asia. Lettuce has been in cultivation for over 2500 years.

KALE: Kale is native to Western Europe. It is thought to be the ancestor of cabbage.

SPINACH: Spinach is considered native to southwestern Asia, but it has been cultivated in Europe since the 11th century.





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Social Studies #3

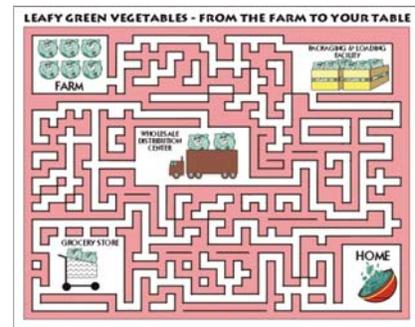
OBJECTIVES: Students will recognize the steps that leafy green vegetables follow from the farmer's field to the consumer's table.

Materials needed:

1. 5 strips of colored construction paper for each student
2. Crayons
3. Tape
4. 1 Maze sheet per student

Directions:

1. Have students go through maze to find the steps that leafy greens vegetables follow from the farmer's field to the consumer's table.
2. Have students write each stop in the vegetable's process on a separate strip of paper (farmers field, packing shed, distributor, grocery store, consumer's table), discussing each stop. Have students lay the strips out in front of them in the correct order.
3. Have students tape the first strip (farmer's field) into the shape of a circle and loop the second strip through the first strip in the shape of a circle. Add the other strips one at a time to make a chain. Display chain in the classroom.
4. Have students write a paragraph about the sequence in which they placed the different steps.





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Science/Health #1

OBJECTIVES: Students will understand nutritional benefits of cruciferous vegetables.

1. Refer to class textbook for SEED study. Cross section of seed will help students learn EMBRYO (tiny part of seed that grows into new plant). Explain that the rest of the seed contains stored sugars that it uses to grow and develop.
2. Discuss the basic needs of a plant (water, air, loose soil, sunlight). When the seed has what it needs, it GERMINATES (starts to grow and develop). Then PHOTOSYNTHESIS occurs (the way leaves of green plants make most of the sugars a plant needs). Grow lettuce, cabbage or broccoli plants from seeds in cups/cartons in classroom. Lettuce seed is 7-10 days to germination; planting depth - 1/4 inch; 82 days to harvest. Cabbage is 10-12 days to germination; 1/2 inch planting depth; 71 days to harvest. Broccoli is 10-14 days to germination; planting depth is 1/2 inch; 90 days to harvest. Withhold water from one and sunlight from another. Draw conclusions from measurements and graphs of growth of all the plants during the leafy greens study. (For extended classroom growing project, refer to *The Apartment Farmer* by Duane Newcomb, Tarcher, Inc., Los Angeles.) After lesson, students may take plants home to transplant.
3. Use food coloring and a heavy stalk leafy green or celery to show transportation of water through a plant.
4. Help students find articles in newspapers about weather conditions affecting the growth of crops (freeze, drought, etc.). Explain the impact on the cost of these foods to the consumer. (Prices may rise due to limited supplies damaged by nature.)
5. Arrange a tour of a local grocery store on delivery day. Try to tour a refrigerated truck and discuss food spoilage during transport. Have the produce manager explain the "sprinkler" system in the produce cases. Go on a scavenger hunt to find foods with leafy greens in them (slaw, sauerkraut, etc.).
6. Help students cut out pictures from magazines of healthy foods and people doing some sort of exercise. Discuss the importance of a nutritious diet and good exercise to stay healthy. Begin classroom discussion of the phrase, "You are what you eat!"
7. Why do we need to eat foods? We need energy from foods for work and play. The parts of food that help your body grow are nutrients. LEAFY GREENS contain Vitamin A, Vitamin C, Calcium, Iron, Fiber. These nutrients:
 - help build strong teeth and bones
 - help body to fight infection
 - helps growth and health of hair and skin
 - are Fat Free, Cholesterol Free, Low in calories, Low in Sodium
8. According to the Food Guide Pyramid, we need 3-5 servings vegetables per day (Children need 4). 1 serving = 1 cup of leafy raw veg or 1/2 cup of chopped raw or cooked veg. Have students demonstrate through standard measurements the amount of vegetable needed for a serving. The darker the leaf, the more nutritious the green.
9. Where do kids get energy? Food! Have students create a food link chain: farmer, processor, grocer, you!
10. Place a few peanuts or chips on one brown paper bag. Place a few dry lettuce leaves or broccoli on another bag. Explain that the oily spot on the bag is from the fat in the peanuts. There is no fat in lettuce or broccoli to leave a soil. Chart results using class database on a scale of 1 - 5 (1 no oil to 5 very oily).

Go to Cruciferous Crusaders Scramble Activity Sheet

Answer Key: strong teeth, bones, fight infection, hair and skin





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Science/Health #2

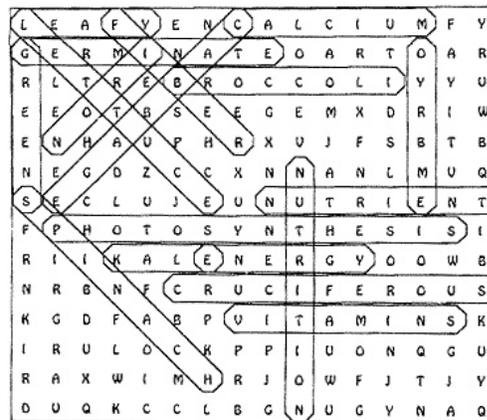
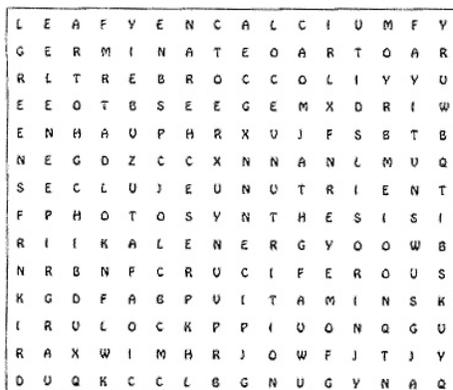
OBJECTIVES: Students will understand cancer-fighting elements in cruciferous vegetables.

The National Academy of Sciences, National Cancer Institute, and American Cancer Society have all urged people to eat foods low in fat and high in fiber, vitamin A and vitamin C. Eating foods low in fat, cholesterol, salt and sugar, and high in fiber reduces the risk of heart attack, stroke, diabetes, obesity, tooth decay, and constipation. Following these guidelines should improve your chances for a long, healthy life. The National Cancer Institute reports that foods rich in vitamins A and C have been associated with the reduced risk of certain cancers, such as of the larynx, esophagus, and the lung. The American Cancer Society notes that cabbage helps prevent cancer of the colon and stomach.

According to Dr. Wendy Demark at the Duke Comprehensive Cancer Center, diet plays a big role in cancer prevention. It is estimated that over one third of all cancer-related deaths could be prevented by a healthy diet. Fruits and vegetables are key. Research suggests that people who eat at least 5 servings of fruits and vegetables per day cut their cancer risk in half when compared to those who consume one serving or less. Vegetables are especially nutrient dense. Calorie for calorie they pack more vitamins, minerals, fiber, and other cancer fighting agents than any other food group. Cabbage family (cruciferous) vegetables are particularly powerful cancer fighters.

1. Have students name ways that they have eaten cruciferous vegetables (salads, casseroles, steamed, etc.) Take a poll of how many students ate vegetables yesterday. Brainstorm ideas for other ways to eat them.
2. Demonstrate proper hand-washing techniques. Then demonstrate washing leafy greens. Wash greens thoroughly by placing them in a sink filled with lukewarm (tepid) water and swish around. Remove any roots or stems, repeat washing. Pat dry on paper towels.
3. Extend personal hygiene concepts to show the need for sanitation regulations in food care and handling. Set up a tour of your school cafeteria kitchen and ask the manager to show the students sanitation procedures.

Go to Cruciferous Crusaders Cancer Fighter Search Activity Sheet



E A T Y O U R L E A F Y
G R E E N S



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Culminating Activity

1. **Parent Lunch:** Students share "Cruciferous Crusaders" portfolio of class work across the curriculum with parents. "Placemat" made in Math #7 may be used. Students create an attractive invitation on a computer or in art classes for parents and/or other teachers to attend a salad lunch. Students make a salad with a variety of fresh greens for a great combination of color, taste and texture. They can wash, tear, toss, add toppings, and even mix a low cal. dressing. Suggested toppings include crisp bacon, chopped onion or scallion, feta cheese, sauteed sliced fresh mushrooms or croutons. A hollowed out cabbage filled with (ranch, for example) dressing may be an appropriate chip/veggie dip. Add bread/crackers and beverage. (Students' salads may be set up like a salad bar, if desired.)
2. Have students **find pictures** of leafy greens in magazines/newspapers. Make a collage. Discuss benefits of eating leafy greens vegetables. (Better health, prevent cancer).
3. **Mystery Vegetable:** Put leafy greens vegetables in a paper bag. Feel shape, smell - then guess the mystery.
4. Make up **Cruciferous Crusaders** cartoons stressing the benefits of leafy greens vegetables.
5. **Contact Home Extension Service** and invite Home Economist to speak to class on the benefits of leafy greens vegetables.
6. Have students **write thank-you notes** to anyone who has spoken to class or given class a tour.
7. **Set up a tour of a leafy greens farm.** Let students see the production, harvesting, packing, etc. of leafy greens. Have students ask question, take notes, and write a report on what they learned.
8. Have students **write the Department of Agriculture** in each of the 50 states to see if that state grows leafy green vegetables and ask them to send information on the leafy greens grown. Have students gather information for a short presentation to class.
9. **Find newspaper articles** on leafy greens vegetables. Also look for articles on how weather affects crop production, harvesting, and pricing.
10. **Make a bulletin board display** for your classroom or cafeteria.



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Test Item Bank

Math

1. Hannah sold 8 broccoli bites and 9 drinks. How many items did she sell?
Answer: 17
2. Justin sold broccoli bites to Caroline for \$3.50. She gave him a \$5.00 bill. How much change did she receive?
Answer: \$1.50
3. Jonathan sold 5 broccoli bites to each of 6 people. How many bites did he sell?
Answer: 30

Science

1. What are the four basic needs that a plant must have to grow?
Answer: Water, air, loose soil, sunlight
2. What are the names of 5 nutrients your body absorbs when you eat leafy greens?
Answer: Vitamin A, vitamin C, calcium, iron, fiber

Language Arts

1. Name 3 leafy greens vegetables.
Answer: Lettuce, spinach, cabbage, (broccoli, kale, etc.)
2. Leafy greens vegetables help your body fight what disease?
Answer: Cancer
3. _____ makes a healthy, low calorie salad.
Answer: Lettuce

Social Studies

1. Name 2 states in the United States where farmers grow leafy greens vegetables.
Answer: California, Texas, North Carolina, etc.
2. Number the following from 1 to 5 to show how a leafy greens vegetable gets from the farmer's field to your table.
Answer: Farmer's field, packing shed, distributor, grocery store, consumer's table



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Sources & Acknowledgements

Leafy Greens Integrated Lesson Plan written by Rosemary Young, Perquimins County, NC Schools and JoAnn Small, Dare County, NC Schools.

Sources:

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- NC Dept. of Agriculture, Northeast Marketing Center, Elizabeth City, NC
- "5 A Day"
- US Dept of Health & Human Services
- Public Health Service
- National Institutes of Health