

Cabbages

1. **Make a list of cruciferous vegetables that you eat and those you would try. What phytochemicals do they contain and what health benefits do these provide to your body? Develop a list of snack suggestions that include cruciferous vegetables and share with your classmates.**

Answers will vary.

- A phytochemical is a natural bioactive compound found in plant foods that works with nutrients and dietary fiber to protect the body against disease.
- Phytochemicals can have complementary and overlapping mechanisms of action in the body, including:
 - antioxidant effects,
 - modulation of detoxification enzymes,
 - stimulation of the immune system,
 - modulation of hormone metabolism, and
 - antibacterial and antiviral effects.
- Research suggests that phytochemicals, working together with nutrients found in fruits, vegetables and nuts, may help slow the aging process and reduce the risk of many diseases, including:
 - cancer,
 - heart disease,
 - stroke,
 - high blood pressure,
 - cataracts,
 - osteoporosis, and
 - urinary tract infections.

Vegetable:	Phytochemicals found in vegetable:
Bok choy	Sulphoraphane, indoles
Broccoli	Beta-carotene, lutein, quercetins, sulphoraphane, indoles

Broccoli sprouts	Sulphoraphane
Brussel sprouts	Sulphoraphane, indoles
Cabbage	Sulphoraphane, indoles
Cauliflower	Sulphoraphane, indoles
Collard greens	Lutein, sulphoraphane, indoles
Kale	Beta-carotene, lutein, quercetins, sulphoraphane, indoles
Swiss chard	Lutein, sulphoraphane, indoles
Turnips	Sulphoraphane, indoles

2. Fruits and vegetables are categorized into color groups based on their nutrients and phytochemicals. Research why red cabbage is part of the blue/purple color group (not the red group) and white-colored cabbage is part of the green color group. (Hint: Find what nutrients and phytonutrients are common to each color group.) What other fruits or vegetables fit into these color groups? Look for recipes you can prepare at home that include these fruits and vegetables.

- Red cabbage is in the blue group due to the presence of anthocyanin, whereas lycopene is the predominant colored pigment in the red group.
- **Anthocyanin:** from Greek: ἀνθός or *anthos* (flower) + κυανός or *kyanos* (blue). Anthocyanins are water-soluble vacuolar flavonoid pigments that appear red to blue, according to pH. They are synthesized exclusively by organisms of the plant kingdom and have been observed to occur in all tissues of higher plants, providing color in leaves, stems, roots, flowers, and fruits.
- Other fruits and vegetables in the blue/purple group are eggplants, dried plums, purple figs, raisins, blueberries, purple grapes, and plums.
- White colored cabbage is in the green group rather than the white group due to the nutrients and phytochemicals.
- Cabbage contains sulforaphane, isothiocyanate, and indoles. The nutrients found are Vitamin K and Vitamin C.
- White fruits and vegetables typically contain the following nutrients: folic acid (or folate), potassium, selenium, and Vitamin C.
- Other green category foods are green peppers, honeydew melon, peas, spinach, green apples, green beans, green grapes, and broccoli.

3. Blue/purple fruits and vegetables – like purple and red cabbages – contain anthocyanins. What are anthocyanins and what do they do for the mind and body? Develop a plan to include more blue/purple fruits and vegetables in your meals, if needed.

- Anthocyanins are the water soluble, reddish pigments found in many fruits, such as strawberries, cherries, cranberries, raspberries, blueberries, grapes and black currants.
- Anthocyanins inhibit cholesterol synthesis, provide antioxidant cell protection, and may help prevent binding of carcinogens to DNA.
- These fruits may provide protection against heart disease and certain cancers.

4. Develop a Venn diagram to compare and contrast various characteristics of grapes and raisins, including nutrient values. Give a presentation that explains the changes in nutrient composition when grapes are dried.

Answers will vary.

Sources:

www.ers.usda.gov

www.leafy-greens.org/cabbage_family.html

www.oznet.ksu.edu/library/fntr2/samplers/MF2649.asp

www.goaskalice.columbia.edu/2180.html (Columbia University's Health Q&A Internet Service)

www.dole5aday.com/referencecenter/nutritioncenter/phytochemicals/phyto_table.veggies.jsp

Craig, W.J., *Phytochemicals: Guardians of Our Health – A Continuing Education Article*, Andrews University, Berrien Spring, MI, 2006.

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