

LESSON:

Echinacea No Cure-all for Kids

Summary: In this warm-up exercise, which can take 20 minutes or less to implement, students look at real data presented in a table and answer the question "If you were a doctor, would you recommend taking echinacea to cure a cold?" Students must use the data to support their answer and write their conclusion in paragraph format. Students then read the short news article "Echinacea No Cure-all for Kids" to see if their conclusions are reasonable. If time permits, the students can write a statement about whether their conclusion is similar to that of the researchers.

EHP Article(s): "Echinacea No Cure-all for Kids," *EHP Student Edition*, January 2005: A466
<http://ehp.niehs.nih.gov/docs/2004/112-8/forum.html>

Objectives: By the end of this lesson students should be able to describe whether data support the hypothesis that echinacea shortens the length of a cold.

Class Time: 10–20 minutes

Grade Level: 9–12

Subjects Addressed: Life Science, Biology, Health, Math

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► **Prepping the Lesson (5 minutes)**

INSTRUCTIONS:

1. Obtain a class set of *EHP Student Edition*, January 2005, or download article a www.ehponline.org/science-ed and make copies.
2. Make copies of the student instructions.

MATERIALS (per student):

- 1 copy of *EHP Student Edition*, January 2005, or 1 copy of article "Echinacea No Cure-all for Kids"
- 1 copy of the student instructions

VOCABULARY:

Drug
Echinacea
Herbal supplement



BACKGROUND INFORMATION:

Herbal supplements are defined as “dietary supplement[s] that contain herbs, either singly or in mixtures” on the National Center for Complementary and Alternative Medicine website at <http://nccam.nih.gov/>. Use of herbs as an “alternative medicine” has grown in popularity among mainstream Americans and is finally receiving the attention of scientific researchers. It is important to have solid research support about herbal supplements regarding the effectiveness of the herb in respect to its purported health effects, the safety of the herbal supplement, and the consistency of quality among brands or refining processes of the supplement.

When using herbal supplements, people need to be aware of multiple factors to protect their health. A common misconception about herbs is that because they are “natural” they are safer. The most toxic substance known on earth is “natural” and comes from the bacterium *Clostridium botulinum*. Most people know the poisoning from this bacterium as botulism. According to the article *Botulinum Toxin as a Biological Weapon* (JAMA 285:1059–1070 [2001]) “a single gram of crystalline toxin, evenly dispersed and inhaled, would kill more than 1 million people.” Clearly “natural” is not synonymous with safe or nontoxic.

An herbal supplement should be viewed as a drug, defined as “any substance intended for use in the treatment, prevention, diagnosis, or cure of disease” (<http://www.webster-dictionary.org/definition/drug>). When viewed from this perspective, one can readily consider potential toxic side effects of an herbal supplement that could occur simultaneously with treatment. For example, the herb comfrey, which is claimed to improve circulation and help control internal bleeding (<http://www.renewedhealth.ca/welcome.asp>), may cause significant liver damage (NIH, NCCAM, 2004). Regulated pharmaceutical medicines are required to conduct research to identify unintended toxic side effects of a drug, and then report those effects to consumers (recall the fast-talking announcement at the end of TV ads for prescription drugs). Herbal supplements have not reached that level of regulation and could potentially be very harmful to an unknowing consumer.

Not only will future scientific research be useful in identifying potential toxic effects of herbal supplements, it will help determine the effectiveness of the herb as a viable treatment option. Research may find that the herb does indeed do what it claims, or it partially does what it claims (as appears to be the case for echinacea according to the companion article to this lesson, “Echinacea No Cure-all for Kids”). Research may even find a new health application of an herb or simply define the safest, most effective dose of an herbal supplement.

Research on the purity or consistency of quality of an herbal substance has raised some concerns as well. For example, toxic by-products or unintended contaminants like lead have been found in supplements, including echinacea (<http://www.consumerlab.com/results/echinacea.asp>). There are other important considerations about herbal supplements, including potential interactions with prescription drugs and a need to define their active ingredients.

RESOURCES:

Environmental Health Perspectives, Environews by Topic page, <http://ehp.niehs.nih.gov/topic>. Choose Children’s Health, Herbal Medicine, Pharmaceuticals/Drug Abuse

Consumer Lab.com—Product Review: Echinacea, <http://www.consumerlab.com/results/echinacea.asp>

National Institutes of Health (NIH), National Center for Complementary and Alternative Medicine (NCCAM)—Herbal Supplements: Consider Safety, Too, <http://nccam.nih.gov/health/supplement-safety/>

National Institutes of Health (NIH), National Center for Complementary and Alternative Medicine (NCCAM)—What’s in a Bottle? An Introduction to Dietary Supplements, <http://nccam.nih.gov/health/bottle/>

▶ Implementing the Lesson**INSTRUCTIONS:**

1. Hand out copies of the student instructions.
2. After students have completed their written answer, hand out copies of *EHP Student Edition*, January 2005, and refer students to the article “Echinacea No Cure-all for Kids” or hand out copies of the article.
3. Have students read the article to see if their conclusions are reasonable and consistent with the conclusions described in the article.
4. If time permits, have students write a statement about whether their conclusions were similar to the researchers’ and why.
5. Have the students hand in their work immediately upon completion.
6. An extension of this lesson can include an analysis of the research; why certain conclusions may be correct, incorrect, or unsupported by the information; and what additional information would be helpful to reach a correct conclusion.



NOTES & HELPFUL HINTS:

- Instead of having the students write about whether or not their conclusion matches that of the researchers (as described in the article), you could have a brief class discussion.
- National Science Teaching Standard C: Have students do a formal self-assessment of their conclusions and then discuss the logic behind certain conclusions.
- National Science Teaching Standard B: Have students discuss additional data they would need to address any uncertainties about recommending echinacea.

▶ Aligning with Standards

SKILLS USED OR DEVELOPED:

Reading tables; critical thinking and response; data analysis

SPECIFIC CONTENT ADDRESSED:

Medicine, health, herbal supplements

NATIONAL SCIENCE EDUCATION CONTENT STANDARDS MET:

Science as Inquiry

- communicate and defend a scientific argument

Science in Personal and Social Perspectives

- personal and community health

TEACHING STANDARDS:

B. Teachers of science guide and facilitate learning. (Please refer to the section Implementing the Lesson: Notes & Helpful Hints for recommendations about how to meet this standard using this lesson.)

C. Teachers of science engage in ongoing assessment of their teaching and of student learning. Guide students in self-assessment.

▶ Assessing the Lesson

Students provide a written response to the question “If you were a doctor, would you recommend taking echinacea to cure a cold?” The response must include a justification using the data. Students have the opportunity to self-assess.

Warm-ups can be graded on a simple “completed” or “not completed” basis within a given amount of time or graded using the guidelines below.

After looking at the data presented in a table, students are supposed to answer the question “If you were a doctor, would you recommend taking Echinacea to cure a cold?” Conclusions can be “yes” or “no” but need to include the following to justify their answer:

Reasons for a “no” answer

- There is no difference in the amount of time a cold lasts using echinacea compared to using nothing (placebo).
- More children got a rash if they took echinacea.

Reasons for a “yes” answer

- Although the research showed that echinacea did not shorten the length of time for a cold, the children taking echinacea appeared to get fewer colds than those taking the placebo.



STUDENT INSTRUCTIONS: Echinacea No Cure-all for Kids

Step 1: Look at the data in the table below and answer the question: "If you were a doctor would you recommend taking echinacea (pronounced *eck-I-NAY-sha*) to cure a cold?" Justify your answer using the data below (1–2 paragraphs).

Sample Description	Treatment	Results 1	Results 2	Results 3
407 children in the sample	337 upper respiratory infections were treated with echinacea (a natural herbal remedy)	7.1% of those who took echinacea got a rash	Upper respiratory infection was better in 10 days	52.3% of the children taking Echinacea got more than one cold during the study period
Ages 2–11 years	370 upper respiratory infections were given a placebo (a pill with no medicine)	2.7% of the children taking the placebo got a rash	Upper respiratory infection was better in 10 days	64.4% taking the placebo got more than one cold during the study period

Step 2: Read the article "Echinacea No Cure-all for Kids," *EHP Student Edition*, January 2005: A466.
<http://ehp.niehs.nih.gov/docs/2004/112-8/forum.html>

See if it matches your interpretation of the data. If your teacher instructs you to do so, describe in a written statement whether or not your conclusion was reasonable and matched that of the researchers. Be sure to discuss why it did or did not match.

