Take a Scientific Road Trip:

Use the Map and Follow the Signs

Lesson Overview

This lesson focuses on gaining an understanding of the scientific inquiry process as it applies to our knowledge of nutrition and fitness. Students learn to discern fact from fallacy based on an ability to understand and interpret current research. Fallacies or misconceptions about nutrition and fitness are often due to a perception that particular foods, nutrients, or behaviors will either kill you or cure you. This "all or nothing" mentality is in contrast to the philosophy of moderation. Use "hot" topics in nutrition and fitness (fad diets, dietary/fitness supplements, good/bad fats, cancer-causing and cancer-preventing food components, organic food, biotechnology, vegetarianism, etc.), to help your students discover how research uncovers nutrition facts and how scientific understanding determines current recommendations for health.

Destination: Discerning Fact from Fallacy in Nutrition Science

- Students will appreciate that scientific inquiry is an ongoing journey and rarely has a final destination, but that further investigation leads to deeper understanding and sometimes conflicting findings from previous research.
- Students will be able to describe important components of sound research and use discernment to put findings into context of other research.
- Students will be able to describe one or more current nutrition facts or fallacies and explain how current research findings either defend or dispute the claims.

Itinerary

To take the "Shortcut" in 30 minutes, follow this route in class:

- Ignition (5 minutes)
- Driver's Ed (20 minutes)
- Take the Keys (5 minutes)

To take the "Standard Trip" in 40-50 minutes, follow this route:

- Ignition (5 minutes)
- Driver's Ed (20 minutes)
- Test Drive (15 minutes)
- Take the Keys (5 minutes)

To take the "Extended Trip" in 90 minutes or two class periods, follow this route, or complete two lessons:

- Learner's Permit (10-15 minutes)
- Ignition (5 minutes)
- Driver's Ed (20 minutes)
- Test Drive (15 minutes or with extended discussion 30 minutes)
- Alternate Route (15 minutes)
- Take the Keys (5 minutes)
- Take the Wheel (10 or more minutes, just begin assignment)

Packing for the Journey:

- Select pre-class assignment option and assign well in advance of class.
- Select "route" to take and activities and examples to use.
- Obtain examples of nutrition news and research articles, as needed, in place of, or to supplement what students bring to class.
- Read background information about current nutrition topics you plan to discuss.
- Copy student handouts to match your selected activities.
- Chalkboard or overhead projector and transparencies
- Computer and Projector for Power Point
- Student Assessment
- Select follow-up activit(ies) for students to complete.

Your Teaching Road Map . . .

Give Students a Learner's Permit

Students can warm-up for this lesson with the pre-class assignment on the handout "Prepare for a Scientific Road Trip" (page 43). This assignment is a great follow-up to reinforce the first lesson as well as get students to think about the topic of this lesson. You will want to provide students with ample time to complete this assignment, especially if you want them to be on the lookout for news stories from sources other than the web. The handout can be copied with the web site list from the first lesson copied on the reverse side in place of the "Headline" handout, or give the web site list as an additional resource.

Options:

- Can be completed as an in-class activity, if time allows, and a computer lab is available.
- May want to show an example of nutrition news and a corresponding research article *you* located, using the same instructions as on the handout.
- Before you give the assignment, you might ask your class to speculate what type of news stories will be most common and then check how well they predicted when the stories are brought in and categorized.

The "Headline" worksheet (page 44) can be completed before class, or, at the beginning of class. If completed before class, you can decide whether to have students do only the first part where they check their opinion; or, do the second part as well, in which the students solicit the opinions of others. If this second part is *not* done with the pre-class assignment, it can become a "carpooling" follow-up activity after the lesson is covered in class.

Put the Key in the Ignition: Sensational Fad or Sensible Fact?

This introductory activity uses the student "Headline" handout (page 44), which can be completed as a pre-class assignment or at the beginning of class as students arrive. Take a poll of how many students (and others if measured) agree, disagree, or are not sure if they believe, the nutrition headlines on the handout. Tally the totals on the chalk board. (Power Point slides or overheads are available to help present the lesson.)

Slide 1: **What makes these headlines appealing?**
What "sells" the news, books, fad diets, etc.?

Slide 2: *Help students understand: "Appealing" headlines and claims often simplify what is actually a very complex issue, because people want certainties rather than possibilities. Fads appeal to the human desire for quick and easy solutions to problems.*

Can you tell whether the statement is true or false?
Are there clues that make the statement less likely to be (absolutely) true?

Slide 3: **Misconceptions about foods, nutrition, fitness and health are often due to claims and perceptions that particular foods, nutrients, or behaviors will either kill you or cure you.**

Which of the headlines are "cure-alls"? Which ones are "killers"? This could be called "all or nothing" thinking.

Let's learn why that kind of thinking leads to a lot of confusion and how we can use science and common sense to tell fact from fallacy.

Driver's Ed

Let's see what the headlines were for the news stories *you* found.
Hopefully, they contained sensible facts and not sensational fads.
Invite several students to share. If desired, summarize main idea/headline from each and make a list on the chalkboard or an overhead transparency.

Optional discussion point:
What *kinds* of news stories did you find?
Some of the possible categories include: New discovery; link between food or nutrient and disease; harmful effect of a food, substance, supplement, or behavior on health; beneficial effect of a food, substance, supplement, or behavior on health; something that impacts body weight; something that promotes wellness or performance, etc.

What are the "hot" topics in nutrition news today?
Select beforehand, or from the headlines students bring to class, a claim to "test" via the scientific inquiry process. You can have a simple oral discussion, or use the power point slides or overheads provided, which include an example similar to those in the "Design the Perfect Study" activity, to enhance the discussion. Fill in the blanks on your lesson plan before teaching, using the example provided, or another.

As you state each question allow ample time for students to respond. Prompt if needed, but try to get students to come up with the answers rather than provide them. (Wait to advance slide that provides the answer.)

Slide 4: Why are these statements made? Does someone just make them up? What made someone decide to make the claim that _____?

Slide 5: Why does anyone even think something happens, or one thing is associated with something else, in the first place?

Slide 6: All of these statements began with **observations,** which is the first step in the scientific process. We notice a potential association between one thing and another and ask if this is cause and effect, or just chance.

What would have been a possible observation for this claim?

Slide 7: Much of the research that leads to our knowledge of nutrition and its impact on health is **observational research.** This type of research often studies how particular health or disease outcomes are distributed in a population. It may seek to determine if certain associations exist between various aspects of health. For example, is heart disease more common in smokers than nonsmokers, or in people who are overweight? Observational research is often completed by collecting data or taking surveys and then looking for associations between various factors.

Slide 8: When we observe a possible relationship, we try to explain it. What is the scientific word for these possible explanations?

Slide 9: An observation leads to a **hypothesis**, which is a potential explanation of the observation. It is an educated guess.

What might be a possible hypothesis for our observed association?

Many claims don't go beyond the hypothesis stage, and the potential explanation is stated as a certain fact rather than a possibility.

Why might this be a problem?

There might be a different explanation for the association.

An example (from the IFIC Review, see Resources) of this is: "Driving a Cadillac increases your risk for heart disease!" This claim is based on an observation that drivers of Cadillacs have more heart attacks than people who drive other cars. Do Cadillacs cause heart attacks?
No. The association is between driver characteristics (age, gender, weight, etc.) and heart disease.

How could we test our hypothesis?

Slide 10: **Experimental research** is the systematic process of testing a hypothesis. Observational research can suggest relationships, but it takes experimental research to determine cause and effect. In many experimental research studies, some type of treatment or intervention is given to test whether it leads to the predicted outcome.

Let's design an experiment to test our hypothesis. I'll describe a study design and you decide if it is good research:

Slide 11: We'll get a group of 3 of our friends to _____ and see if _____ happens. Would that prove our claim?

Slide 12: Good experimental research has a large enough **sample size** to test the hypothesis with confidence. What is true in a few people may not apply to others. The more people (called "subjects" in research) in the study, the stronger the findings.

Also, your friends would probably be biased and might do things to make the desired outcome appear to be true.

Slide 13: So, we'll recruit 100 _____ (describe an appropriate population for your research study) to participate in our study.

We'll have all of them _____. (Describe what you are studying, but have the entire group receive the same intervention.)

We'll measure _____.
(Describe outcome that hypothesis is testing.)

Would that be a good study?

Driver's Ed

Slide 14: Good experimental research includes both **experimental and control** groups. The control group does not receive the treatment (or intervention), to measure how much of the change in _____ (whatever is measured) is due to the treatment being studied.

Slide 15: So, we'll let our subjects volunteer to be in the experimental or control group. How does that sound?

Slide 16: Good experimental research selects the subjects **randomly**, such that each participant in the study has an equal chance of being in the experimental or control group.

Ideally, subjects are not aware of which experimental group they are in. This is often accomplished with the use of a placebo, something that appears just like the experimental treatment.

Slide 17: So, we'll assign our subjects randomly to ____ (number) of groups – (Describe different interventions, but make sure your description includes an obviously important factor not being controlled.) Then ask: Would that be a problem?

If _____ is not accounted for, would you know how each group varies in _____, which may be the reason for the observed outcome?

Slide 18 & 19: This **control of variables** is essential for good research. In this example, if we found that people who _____ also _____, we could follow this first study with one that controls for _____ and _____ to see if _____.

Slide 20: **Research is a process.** One study alone is never the final answer. Additional studies need to follow preliminary studies. These studies can examine different variables, study the question with different types of people, or in animals such as mice, or in different situations, using different methods, etc. Follow-up studies sometimes get the same results, making the initial findings stronger, and sometimes they get different results, resulting in those controversies you hear about so often. It takes many studies done by trained researchers, with the results reviewed by other scientists and statistically analyzed, to make conclusions about cause and effect. (When a study says that the results are "statistically significant," that means the likelihood the outcome was due to the treatment or intervention studied, has been mathematically determined to be very strong, and the likelihood that the outcome was *not* due to the intervention, was quite small, e.g. only 5% when $p > 95\%$.)

Slide 21: **Before official recommendations and guidelines are made, many studies are completed and analyzed by experts.** Recommendations such as the Dietary Guidelines for Americans, Healthy People 2010 Goals, the Food Guide Pyramid, and Dietary Reference Intakes, are all examples of recommendations based on years of research and numerous studies. Guidelines are set forth by groups of scientific experts who come to an agreement on what the current understanding of diet to health and disease indicates are the optimum dietary intakes and practices for various groups of people. Guidelines change when further research provides new information and increases our understanding of nutrition, health and disease.

Design the Perfect Study

Break students into small groups. Provide each group with a different research question to study. Slightly "absurd" questions, as in some of the examples which follow, make for a fun and lively activity, so feel free to improvise and be creative. This activity could take variable amounts of time to complete; adjust your instructions and expectations to fit your available time.

Possible research questions (fill in on handouts "Design the Perfect Study" on page 45 before you pass them out).

- Do teachers who eat breakfast every day give fewer detentions than teachers who skip breakfast?
- Are students who drink milk with their lunch more likely to get asked out on dates than students who drink soft drinks with their lunch?
- Are students who drink milk with their lunch more likely to achieve and maintain a healthy body weight than students who drink soft drinks with their lunch?
- Are students who eat 5 or more servings of fruits and vegetables a day absent from school less often than students who eat fewer fruits and vegetables a day?
- Do students who play video games after school get more or less sleep than students who engage in vigorous physical activity after school?
- Will increasing the amount of time students are physically active improve student grades?
- Would students choose healthier foods in the cafeteria if less healthy foods cost twice as much money?

Provide students with the handout "Design the Perfect Study" (page 45). Go over the guidelines as needed. Allow groups 15 minutes to outline the basic design of a simple research project to study their assigned question. If time allows to share in class, give each group a blank overhead transparency and colored markers to draw a simple flow chart to describe their methodology. They will then have 2 minutes for one volunteer to share their plan with the class.

Class members will pretend they are the "_____ High School Institute of Health," and after each presentation determine whether to provide funding based on whether the group met all of the criteria for a good research study.

You be the Judge: Fact or Fallacy?

Using the handout (page 46), have students work in pairs or small groups to analyze either a nutrition news story (the one they brought in or one you provide) or a fad diet.

As time allows, discuss their assessments together.

Option: Assign this as a follow-up activity to complete as homework.

Take the Keys

Working together as a class, rewrite the headlines discussed at the beginning of class (handout, page 44) to reflect fact rather than fallacy. Begin by restating the headline as written on the handout. Ask the students what they think is a more factual headline. Provide students with the information written between the old headline and a suggested rewording of the headline as needed.

Cutting Out Carbs Proven for Weight Loss
("Cutting out carbs," which is a nickname for carbohydrates, is primarily effective because it effectively cuts back on calories, which is the "bottom line" when it comes to weight loss. Increased protein *does* have some weight loss benefits, including sparing lean body tissue and increasing satiety (our feeling of fullness over a longer period of time), but protein levels that promote weight loss are moderate and within the new Dietary Reference Intake guidelines and *don't* require drastic reductions in carbohydrate to be effective. So, what might be better words to use than "cutting out carbs"?)
➧ **Cutting <u>Back on Calories</u> Proven for Weight Loss**

Tomatoes Prevent Cancer
(Tomatoes, especially cooked tomatoes, are an excellent source of lycopene, an antioxidant that helps prevent oxidative damage to cells. The key word here is "prevent." Few things totally prevent something. *Abstinence <u>will</u> prevent pregnancy, using condoms only reduces your risk of pregnancy.* In nutrition, a safer word choice is generally "reduces risk" or "helps prevent" or has a "protective effect." So, what would be a more accurate headline about tomatoes and cancer?)
➧ **Eat Tomatoes to <u>Reduce Cancer Risk</u>**

Bioengineered Foods Shown to Alter Human Genes
(Technologies such as genetically-modified foods and irradiated foods often provoke a fear in people that the same technology used with the food will have an effect on them. However, genetically modified foods do not alter *our* genes and irradiated foods don't make us radioactive.)
➧ **Bioengineered Foods are made by Altering Plant Genes –**
<u>No Effect</u> on Human Genes

Calcium Prevents PMS Symptoms
(Most students are aware of the bone-building benefits of calcium but are not aware of some less-well-known benefits such as weight management, lower blood pressure, and reduced severity of PMS symptoms. Again, the word "prevents" needs to be replaced to be more accurate. Not all women will notice a difference in PMS symptoms, and it won't necessarily make all symptoms disappear, but studies clearly show a dramatic reduction in their severity.)
➧ **Calcium <u>Reduces Severity</u> of PMS Symptoms**

Take the Keys

Acne Caused by Eating Refined Flours and Sugars
(Refined flours and sugars are blamed for many problems, acne included, with little or no research evidence to support most claims. The downside of refined flours is that they lack the fiber found in whole grains, and the downside of refined sugars is that they are primarily a source of empty calories. Neither white flour or white sugar is poison.)
➧ **<u>No Diet Proven</u> to Cause or Cure Acne**

New Protein Drink Guarantees Winning Athletic Performance
(No drink, supplement, or special diet "guarantees" winning performance and certainly doesn't substitute for training and practice.)
➧ **Winning Performance Results from <u>Practice, Practice, Practice</u>!**

Aspartame Causes Brain Damage
(This is a classic example of an "urban legend." No scientific studies have shown aspartame to be anything other than safe. The only evidence for "dangers" associated with aspartame use are anecdotal. The only people who cannot use aspartame are those with Phenylketonuria, or PKU.)
➧ **Aspartame <u>Shown to be Safe</u> Dietary Sweetener**

Sugar Makes Kids Bounce Off the Walls
(This is a widely believed myth. However, carefully controlled studies using placebos have consistently proven this to be false. So, why do children appear to "bounce off the walls" after eating candy and drinking soft drinks, etc.? Consider other factors often associated with sugar consumption, including caffeine, a fun event such as a party, and the phenomenon known as a "self-fulfilling expectation.")
➧ **Sugar <u>NOT Shown to Cause</u> Hyperactivity**

Folate New Weapon In Fight Against Heart Disease
(Folate is a B vitamin that is associated with reduced homocysteine levels in the blood. Elevated homocysteine appears to be a risk factor in heart disease due to its role in the build-up of plaque on artery walls. By consuming a diet rich in folate or taking supplements of folic acid, to meet the RDA, we reduce our risk for heart disease. This headline does not suggest that folate alone prevents heart disease but is one weapon in the fight.)
(Keep headline as is.)

Take the Wheel

Provide take-home handout "Take a Scientific Road Trip: Use the Map and Follow the Signs" (page 47). Assign one option or a choice of options. You may copy the web site list (page 31) from lesson one, or the "Headline" handout (page 44), as appropriate, on the reverse side.

Driver's Test: A Scientific Road Trip

1. d
2. b
3. c
4. d
5. a

Driver's Test:
A Scientific Road Trip

1. **What is the origin of all nutrition knowledge?**
   a. the library
   b. nutrition text books
   c. nutrition experts
   d. scientific research

2. **What is a hypothesis?**
   a. an association observed between two factors
   b. an educated guess by a scientist to explain a phenomenon
   c. a test designed to examine the validity of a possible explanation
   d. an interpretation of the results of a study

3. **Which of the following principles of good research design is missing from this example?**

   A research study invites 200 students to sign up for their preference to participate in either a daily fitness class or a daily art appreciation class to test if regular physical activity helps maintain a healthy weight.

   a. adequate sample size
   b. experimental and control groups
   c. random assignment
   d. all of the above are missing

4. **Official dietary goals and recommendations are established as a result of . . .**
   a. the first very well-controlled experiment performed by a reputable lab
   b. individual experts who are responsible for reviewing the literature and writing goals and recommendations about their area of expertise
   c. surveys that are conducted to determine what people are willing to do and setting goals just a little higher
   d. groups of scientific experts who examine numerous research studies and set (and change) goals and recommendations when there is enough scientific evidence

5. **Which of the following statements is *most* likely to be false?**
   a. Eating fruits and vegetables is proven to prevent cancer.
   b. Eating fruits and vegetables reduces your risk of cancer.
   c. Eating fruits and vegetables has a protective effect against cancer.
   d. Eating fruits and vegetables is one dietary weapon in the war on cancer.

Your Spare Tire:
Teaching Resources

For further reading:

For more about the scientific inquiry process, read:
"How to Understand and Interpret Food and Health Related Scientific Studies" An IFIC Review, available as a downloadable publication at the International Food Information Council web site: http://ific.org. Also at that web site are numerous articles on a variety of nutrition topics found under the heading: Food Safety and Nutrition Information.

For a good basic nutrition text:
"The American Dietetic Association's Complete Food and Nutrition Guide," 2002 by Roberta Larson Duyff, MS, RD, CFCS

Also available from ADA:
(both are available for ordering from ADA's web site: www.eatright.org)
"Food Folklore: Tales and Truths About What We Eat," 1998.

"Understanding Nutrition Information" is an interactive series of lessons utilizing scientific thinking to evaluate nutritional claims in the literature and popular media. Available at Purdue University's Foods and Nutrition Cooperative Extension web site: http://www.ces.purdue.edu/nutrition/understanding/.

"Good Science: Its Role in Setting the Record Straight" Dairy Council Digest sSept/Oct 2001. Available online: www.nationaldairycouncil.org.

Web sites:

Refer to list in lesson 1 (pages 24-25)

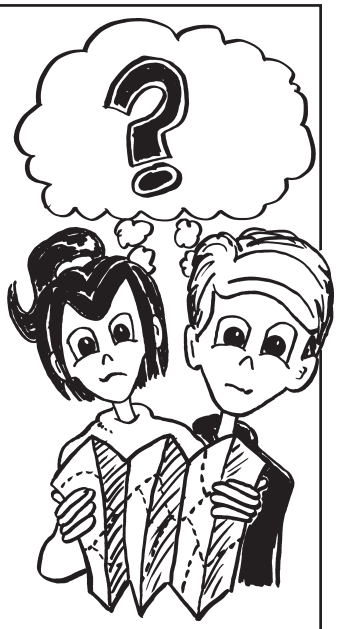
Nutrition Facts and Fables:
http://www.niddk.nih.gov/health/nutrit/pubs/myths/

For electronic nutrition news perspectives via e-mail:
http://www.nutritionnewsfocus.com

For more about evaluating fad diets: **"How to Identify Weight Loss Fraud"**
http://www.healthyweight.net/identify.htm

Prepare for a Scientific Road Trip:

Use the Map and Follow the Signs



Have You Ever Wondered . . .

How the "experts" decide what foods you need and how much you need?
Why these recommendations seem to keep changing?
Who can be trusted to give you the most accurate and up-to-date information?
How to tell fact from fallacy when reading about the latest fad or news story?

What's the Scoop?

Nutrition news is "hot" news. Not a day goes by that information about food, diet, nutrition and disease doesn't make the "news." Take a look and see what nutrition news you can find. Locate one recent nutrition news story or informational article from any of these sources: television, the radio, in the newspaper, in your favorite magazine, or posted on the Internet. Bring a printed copy with you to class (if from television or radio, write it down to the best of your ability and cite the station and date/time of broadcast). Your teacher can provide you with a list of web sites to help you find news stories.

My "source" (list the media source, title, date, etc.):

_____

Title/Headline:

_____

What is the article about? List one main idea/claim:

_____

_____

Get the Facts Straight!

Try to locate a related reference or research article to check out your news story or article. Use the web site list provided by your teacher. Make sure the reference is a reputable source, such as a peer-reviewed, scientific research journal or government web site. Does this source back up the claim made in your story? If possible, bring a printed copy of the reference to class.

Reference Title:

_____

Nutrition Headlines — Believe It, Or Not?

Headlines grab your attention. They are purposefully sensational to entice you to read the entire story. Read over the list of headlines below and decide whether you agree or disagree with what they claim. If you aren't sure, check "not sure." After you have decided for yourself, talk to 2-3 others (friends or family members), who are *not* in your class, and record their opinions. Mark an X on the appropriate spaces, using as many X's as needed to record the opinions of others.

Cutting Out Carbs Proven for Weight Loss

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Tomatoes Prevent Cancer

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Bioengineered Foods Shown to Alter Human Genes

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Calcium Prevents PMS Symptoms

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Acne Caused by Eating Refined Flours and Sugars

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

New Protein Drink Guarantees Winning Athletic Performance

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Aspartame Causes Brain Damage

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Sugar Makes Kids Bounce Off the Walls

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Folate New Weapon In Fight Against Heart Disease

My opinion: _____ Agree _____ Disagree _____ Not Sure
Opinion of others: _____ Agree _____ Disagree _____ Not Sure

Design the Perfect Study

Design a simple research study to answer the following question:

_____

On a separate sheet of paper briefly describe each of the following aspects of your study:

Hypothesis
Write a hypothesis by rewording the question using a statement of what you believe a possible answer to the question could be and possibly why.

Experimental or Observational Research?
Will you observe your subjects, collecting data or conducting a survey, to measure an association between the factors in question? Or, will you conduct an experimental intervention or treatment and measure the outcome?

Research subjects and sample size
Who will be in your study? How many subjects? How will you select them?

Methodology
Will you have groups in your study? If so, how will they be divided?
What will be measured and how? How will variables be controlled, etc.?

Results
What are some potential outcomes? How will you know if your hypothesis is correct? What are some potential reasons for those outcomes in addition to your hypothesis? What follow-up studies would logically follow this one? What recommendations might come as a result of repeated studies that confirmed your hypothesis?

Your High School Institute of Health Allocates Funding

Evaluate each group's study design and determine whether their research plan deserves funding. Your determination should be based on the following criteria:

- ✔ Does the research design fit the stated purpose of the study?
- ✔ Were appropriate subjects selected for the study? Were there enough subjects in the sample?
- ✔ Were the appropriate variables observed? Or, in an experimental research study, was the appropriate treatment or intervention used?
- ✔ Was data collected correctly to measure the outcome in question?
- ✔ How were other variables controlled or accounted for that may have affected the results?

Fact or Fallacy? You be the Judge

Analyze a current nutrition news story, an article from a magazine or web site, or a fad diet, using the following criteria.

Is the headline or claim sensational, or sensible?
Look for words that make something sound like a "cure-all" or a "killer."

What scientific evidence is presented to support the claims made?
Is there a description of research? Does the evidence indicate the use of sound scientific principles, or the writer's opinion? What are the credentials of the investigator or institution where the research was done? Was the research reviewed by other experts? Are limitations of the research presented?

Are the claims, study findings, recommendations, put into "context" ?
In other words . . . Do they agree or disagree with other studies or recommendations? How do they relate to a broader population? How do they fit into everyday "life" – are they realistic? Is the story, article, or diet "balanced," showing both sides of a controversy and clearly describing both risks and benefits?

Take a Scientific Road Trip:

Use the Map and Follow the Signs

The Key of Discernment

You have been given a valuable key to help you evaluate news stories and articles you might read in a magazine or on an Internet web site. Discernment is the ability to separate fact from fallacy. You now have a better understanding of the process of scientific inquiry. Read the "research map" to help you determine truth from fiction and make smart decisions. Scientists and nutrition experts will provide "sign posts," or diet and exercise goals and recommendations based on research, to guide your way.

Carpooling

Get together with *at least* 2-3 others, such as your family at supper, or some friends at your lunch table. Find out whether they agree, disagree, or are not sure if they believe, the Nutrition Headlines on the handout. Record their responses. Share with them what you learned in class. Write up what you find out.

Honk Your Horn

Use one of the following ideas to tell others what you learned about understanding the process of scientific research:

1) Write a story for your school or local paper. Illustrate the difference between sensational and sensible reporting.
2) Make a public service announcement for your school radio station or announcements. Highlight a current fad that students may fall prey to and describe the dangers.
3) Make a poster, bulletin board or display for your classroom, hallway, or lunchroom. Feature "crazy" claims and point out the fallacies.
4) Volunteer to work with a group of younger students in the elementary or middle school in a science class.

Take a Test Drive

Continue work on a nutrition or fitness project by finding current news stories and research articles. Use the web sites provided, as well as do key word searches, to find statistics, facts, news articles, research studies, recommendations and guidelines, programs and ideas.

Check Your Oil

The Internet has many web sites providing information that you can use to learn more about your personal health and wellness. For this activity, select a current guideline that applies to your age and gender and is of interest to you. Find three current and credible references about this topic. Write up a brief summary of what you learn. Include a list of references.

Possible guidelines:

1) Amount of physical activity recommended per day.
2) Amount of fiber recommended per day.
3) Amount of protein recommended per day.
4) Folic acid recommendations for adolescent girls.
5) Calcium needs for teens.
6) Servings of fruits and vegetables recommended per day.
7) BMI guidelines for your age and gender.

And many more!!

Refueling Pit Stop

The Internet is a great resource for recipes. Find a recipe, using one of the web sites listed on the handout, to prepare for your friends or family. Select a recipe to fit one or more of the following criteria: 1) a recipe containing cancer-fighting phytochemicals; 2) a creative vegetarian dish; 3) a meal or snack that helps balance a fad diet plan; 4) a recipe featuring a nutrient you learned more about in a news story or research article; or 5) a recipe featuring a new food product. Try it out and turn in your recipe and a description of how it turned out.