

Food Miles



Two 50-minute class periods

Grades 6-8



Purpose

Students will investigate the steps in a food system and discover the distance food travels to reach our plates. Students will also use the PACED decision making model to make their salad selection.

Academic Content Standards

MN K-12 Academic Standards and Benchmarks

Social Studies

- 7.2.1.1.1** Apply reasoned decision-making techniques in making choices; explain why different households or groups faced with the same alternatives might make different choices.

Science

- 6.1.3.1.1** Describe a system in terms of its subsystems and parts, as well as its inputs, processes and outputs.

Common Core Connections

Science and Technical Subjects

CCSS.ELA-Literacy.RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

National Agricultural Literacy Outcomes

Agriculture and the Environment

- Recognize the factors of an agricultural system which determine its sustainability **(T1.6-8 h)**

Food, Health, and Lifestyle Outcomes

- Explain how factors, such as culture, convenience, access, and marketing affect food choices locally, regionally, and globally **(T3.6-8 d)**
- Identify agricultural products (foods) that provide valuable nutrients for a balanced diet **(T2.6-8 g)**



Background—Agricultural Connections

Growing food and moving it from farm to fork involves several steps and many hands. The **agriculture system** or **food system** needs to be understood before students can make informed decisions about the food they choose to eat. In a highly efficient, modern agricultural system (like we have in the United States), the following steps take place:

- Producing
- Processing
- Distributing
- Marketing
- Consuming
- Disposing

Many of these steps require transportation and an ample supply of energy (fuel and electricity). Each step also involves a great number of people, including bankers, agricultural suppliers, farmers and farm workers, truck drivers, food handlers, government inspectors, millers, bakers, and chefs. Weather conditions, energy price and availability, storage facilities, and transportation problems can all affect this food system.

Interest Approach - Engagement

Display two samples of the same food product - one that is produced locally and one that is not. Examples that would be appropriate for Minnesota include honey, maple syrup, apples, carrots, milk, meat, etc.

Provide students with the Venn diagram worksheet or create a large Venn diagram on a whiteboard or SMARTboard to complete as a class. Tell students to begin by making visual observations:

- What is similar between each of the products? Record observations in the center of the diagram where the two circles intersect.
- What is unique or different for each product? Record these observations in the parts of the circle that do not overlap.

Assist students in making observations using their sense of smell, touch, and taste if possible. Record these in the Venn diagram.

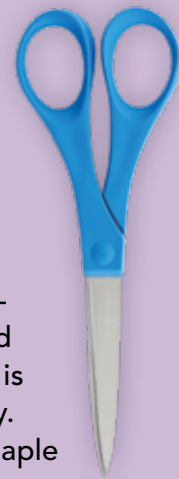
If students have not been able to identify one food product as locally produced and the other non-locally produced, share this information with them and have the students include this on their Venn diagram.



Materials

Interest Approach:

- Venn Diagram worksheet
- Two samples of the same food product - one that is produced locally and one that is not produced locally. Examples: honey, maple syrup, apples, carrots, milk, or meat



Activity 1:

- Six Large sheets of paper
- Markers
- MN Winter AgMag - accessible at <https://minnesota.agclassroom.org/educator/sclb.cfm>

Activity 2:

- MN Ag in the Classroom Dairy Farm-to-Table poster
- SMARTboard or projector
- Redhead Creamery Milk & Cheese video available at https://minnesota.agclassroom.org/educator/video_dairy.cfm
- Venn Diagram worksheet (optional)
- Food clue cards (cut and sorted – 1 set per group)
- Local Salad Miles Traveled Recording chart (1 per group)
- Non-local Salad Miles Traveled Recording chart (1 per group)
- Calculators
- Colored yarn (optional)

Activity 3:

- PACED Decision Making worksheet (1 per student)

Vocabulary

Agriculture System – The people, activities, and resources involved in getting food from farms, ranches, oceans, and other sources to consumers' plates. In this lesson the terms agriculture system and food system are used interchangeably

Producing – Growing or raising plants and animals

Processing – Changing the raw materials into things we eat, wear, and use.

Distributing – Getting the processed products to places like grocery stores and farm markets

Marketing – Advertising agricultural products in places like TV and radio ads, magazines and newspapers, and the internet to help people know about them

Consuming – Using or eating the final products

Disposing – Putting unused or waste products into recycling, compost, or garbage processes

Ask students the following questions to engage:

- Where do you think these products were produced? What had to be done to make this happen? Who was involved? *Assist students in looking at food labels and identify the location where each product was produced. Prompt students to think about all of the people involved in growing the plant or raising the animal needed to make the food product as well as the scientists involved in developing the seed, genetics etc. Also discuss the processors, transportation people, marketers, sales people, service workers, etc. that are needed to get the food product to us.*
- Do you think all locally produced food has the same characteristics as the samples provided today? *Assist students in thinking about the smell, taste, freshness, appearance, nutrition, etc. of food products produced in Minnesota as well as throughout the United States and in other countries.*

Inform the students that today they are going to investigate how food travels from where it is produced to where it is eaten (consumed). Hang on for a fun ride!




Procedures:

Activity 1

Investigating the Agriculture Cycle

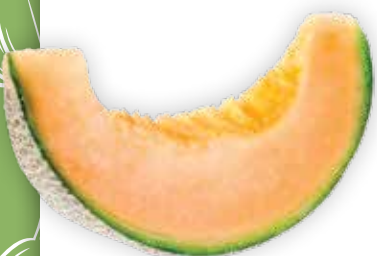
1. Divide your class into six groups. Assign each group a step in the agricultural system: producing, processing, distributing, marketing, consuming, and disposing. Provide a large sheet of paper and markers to each group.
2. Allow 5-10 minutes for each group to discuss their step and write words and draw pictures that help explain their word/step in the agriculture system.
3. Provide each group 2-3 minutes to share the words, pictures, etc.
4. As a class, work to place the steps in the order that they would occur in an agricultural system.
5. Use the MN AgMag Winter issue to define the term agriculture system and examples of each of the six steps. Students can add to their posters with any additional details they learn from the AgMag articles.

- 
6. Facilitate a class discussion that looks at the agriculture system in more detail. Possible discussion questions:
- a. How does the location of production influence the system? *In Minnesota, we can grow many food crops like lettuce, apples, cucumbers, peppers, pumpkins, and more but we aren't able to grow oranges, bananas, pineapples, and many others.*
 - b. Most raw food products go through all the steps but some spend more time in processing. Why do you think this is? Which takes more time: grain between the field and your cereal box and bread, or carrots between the field and your salad bowl?
 - c. Distribution also varies greatly! What factors influence how far food travels before we can purchase it? *Help students recognize that in Minnesota many foods are not able to be grown in the winter so weather/climate/growing season influence how far food travels. If you want to eat strawberries in February they probably had to travel a great distance but if you eat them in June or July you might be able to find them in the community/county where you live. The Minnesota Grown website has information on when different food crops are "in season" at <http://minnesotagrown.com/whats-in-season/>*

Activity 2

Calculating food miles for a salad

1. Inform students that sometimes agricultural systems are titled "local" or "national or non-local". For the purposes of this lesson we will define local as a system that takes place entirely in Minnesota. Other groups and organizations may define local and/or local food differently. Discuss an example of each system:
 - National or non-local system for milk to cheese (the MN Ag in the Classroom Dairy Farm-to-Table poster is a useful tool to visualize this system. The poster can be found at https://minnesota.agclassroom.org/educator/materials_poster_dairy.cfm)
 - Producing: Cows are milked.
 - Processing: Milk is collected and transported by refrigerated truck to a processing facility where it is pasteurized and processed into dry milk. The dry milk is transported by airplane and truck to a factory where it is made into cheese by adding enzyme cultures, rennet and salt. Then the cheese is packaged.
 - Distribution: The cheese is transported by refrigerated truck to a warehouse for distribution and again by truck from the distribution center to your local grocery store.
 - Consuming: You go to the store to buy the cheese and travel home
 - Disposing: None – you ate it all.
 - Local system for milk to cheese featuring Redhead Creamery in Brooten, MN (a video showing this system can be found under Redhead Creamery - Milk & Cheese at https://minnesota.agclassroom.org/educator/video_dairy.cfm)
 - Producing: Cows are milked.





- Processing: Milk travels from the milking parlor through an underground pipeline to the cheese plant that is right next to the milking parlor. Cheese is made by adding enzyme cultures, rennet and salt. The cheese is packaged.
- Distributing: The cheese is moved to the upper level of the cheese plant where it is sold in the on-farm cheese shop.
- Consuming: You go to the Farm/Creamery cheese shop to buy the cheese and travel home.
- Disposing: None – you ate it all.

2. Explain that, on average, US consumers eat food that has traveled 1500+ miles from where it was grown. Walk this out to demonstrate:
 - 1 step = 25 miles
 - Local system (100 miles) = 4 steps
 - Broader local system (200 miles) = 8 steps
 - US Average (1500 miles) = 60 steps
3. Ask the students to compare and contrast the national or non-local agriculture system with the local system. Use another Venn diagram if you would like, or just facilitate a class discussion. Lead students to think about miles traveled in the system, people involved, cost of each product, and taste or quality of each product.
4. Using the same six groups from activity 1, explain that each group will get an envelope containing: Salad Ingredient List and a set of Food Clue Cards. Three groups will use the Local Food Clue Cards and three groups will use the Non-local Food Clue Cards. The goal is for students to find out the total miles that each salad ingredient travels and then to add these up to determine the total food miles for the entire salad. Instruct students to complete the Salad Ingredient List worksheet using the information on the Food Clue Cards. **Teacher Note:** *The non-local clue cards will take longer to calculate so assign to groups accordingly.*

If you would like students to develop their own Local Food Clue Cards the Minnesota Grown website provides a directory of farm locations according to the food products they produce.

5. As each group finishes, ask them to compare their total miles traveled with the other group(s) that were looking at the same (local or nonlocal) salad. If the total miles are different, redo calculations until all groups agree.
6. Record and display the total miles traveled for each salad on your whiteboard or SMART board. Ask students to share their reactions: What do they notice? Are they surprised? What new questions do they have? What does this information tell us? Additional, more in-depth, questions could include:
 - a. Sometimes the non-local food ingredients and products are less expensive than locally produced products. Why do you think this is?
 - b. The Minnesota Department of Agriculture (MDA) started the Minnesota Grown Program 30 years ago as a statewide partnership between the MDA and Minnesota producers of crops and livestock. The program exists to help Minnesota growers differentiate their produce from competitor's produce

from thousands of miles away. How do you think this program affects the local economy? What impacts might it have on consumers (buyers) and producers (sellers)?

- c. When selecting food for you and/or your family, what factors do you consider? Which factors are most important? Why?

7. Optional: If you want to make the miles more “visual” or active here are two ideas:

- Give each local group one color of yarn and each non-local group a different color. Tell the teams to cut a piece of yarn that represents the distance their salad traveled. Each inch of yarn represents 20 miles. Compare the length of each team’s string.
- Energy is needed for transportation. To determine how much energy it took to transport your salad from the farm to your plate, do a jumping jack for every 100 miles your food traveled.

Activity 3

How do you choose the salad for you?

1. Ask the students to think about how they and/or their family make choices about which foods they buy. Use the PACED decision making process to determine which salad each student would select. Have the student complete the worksheet alone or work through the steps as a class.
 - a. Problem: Which salad should I buy?
 - b. Alternatives: Local or non-local
 - c. Criteria: Cost, taste, distance ingredients traveled, availability, others?
 - d. Evaluate: Which criteria are most important
 - e. Decision:
2. Discuss the decisions that the students made. Ask students why different individuals, families’ households, etc. might make different choices.

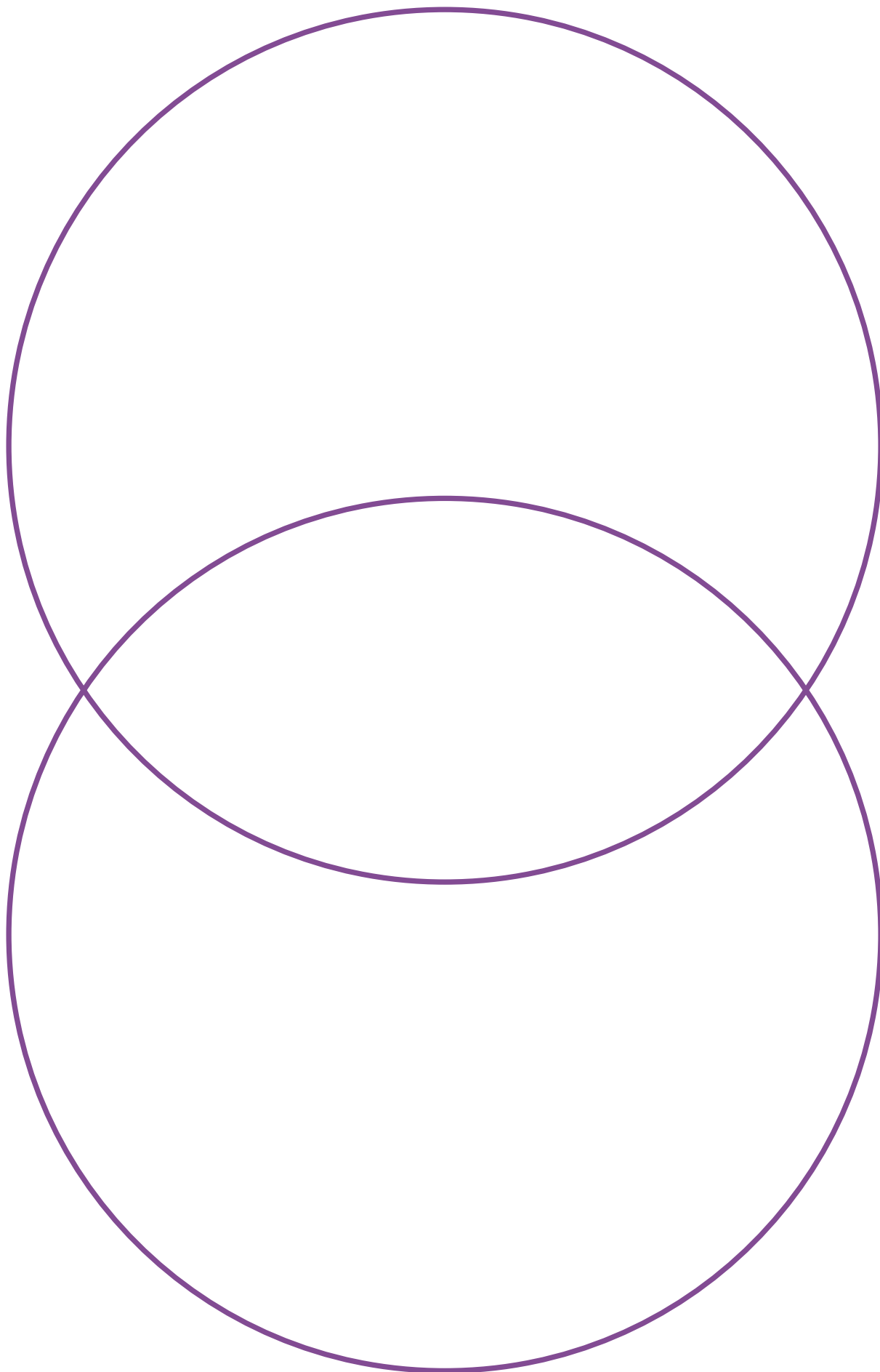
Sources/Credits

- Adapted from lesson developed by Alice Froehlich of Senger Farm, Portland OR and Emily Holer, Shelburne Farms’ sustainable Schools Project, Shelburne VT.



Name

Venn Diagram



Name

Local Salad Miles Traveled

Salad Ingredient	Miles Traveled
Lettuce	
Tomato	
Cucumber	
Corn	

Dressing Ingredient	Miles Traveled
Honey	
Vinegar	

Total miles your salad traveled:	
----------------------------------	--

Name

Non- Local Salad Miles Traveled

Salad Ingredient	Miles Traveled
Lettuce	
Tomato	
Cucumber	
Corn	

Dressing Ingredient	Miles Traveled
Honey	
Vinegar	

Total miles your salad traveled:	
----------------------------------	--

Local Salad Food Clue Cards

Lettuce

1. I was grown in your neighbor's garden.
2. I was picked and traveled 1 mile from your neighbor's garden to your plate.

Tomato

1. I was grown in your backyard garden.
2. I was picked and traveled 0 miles from the vine to your plate.

Cucumber

1. I was grown at Witzel Farm and Garden in Kasson, MN.
2. First, I was picked and transported 16 miles to the Rochester Farmers' Market in Rochester, MN by truck for distribution.
3. Last, I traveled 3 miles from the Farmers' Market to your plate after you purchased me for dinner

Corn

1. I was grown at Produce Plus Inc. in Rochester, MN.
2. I was picked and traveled 0 miles to the market stand.
3. You were out driving 5 miles from your home and when you saw me at the market stand you stopped to bring me home for dinner.

Honey

1. I was made in hives at Johnston Honey in Rochester, MN, where I was harvested, bottled, and labeled.
2. First, I was transported 5 miles to the People's Food Co-op by truck for distribution.
3. Last, I traveled 3 miles from the Co-op to your plate after you purchased me for dinner.

Vinegar

1. I was created at the Leatherwood Vinegery in Long Prairie, MN where I was bottled and labeled.
2. First I was transported 170 miles to the Ferndale Market
3. Last, I traveled 40 miles to your plate after you purchased me.

Non-Local Salad Food Clue Cards

Lettuce

1. I was grown at a farm owned by Foxy Produce Inc. in Castroville, CA where I was picked and packaged.
2. First, I was transported 9 miles to Salinas, CA by truck where I was put in cold storage.
3. Next, I was transported 1,897 miles to the Hy-Vee Distribution Center in Ankeny, IA by cargo plane for distribution.
4. Then, I was transported 201 miles by truck to the Hy-Vee store in Rochester, MN for distribution.
5. Last, I traveled 3 miles from Hy-Vee to your plate after you purchased me for dinner.

Tomato

1. I was grown at a farm in San Joaquin, CA.
2. First, I was transported 20 miles to Sun Ripe Farms in Exeter, CA by truck for washing and packaging.
3. Next, I was transported 227 miles to West Coast Produce in Oakland, CA by truck for distribution.
4. Then, I was transported 1,805 miles by rail to Osceola, IA.
5. A truck then drove me 60 miles to the Hy-Vee Distribution Center in Ankeny, IA for distribution.
6. Then, I was transported 201 miles by truck to the Hy-Vee store in Rochester, MN for distribution.
7. Last, I traveled 3 miles from Hy-Vee to your plate after you purchased me for dinner

Non-Local Salad Food Clue Cards

Cucumber

1. I was grown at a farm in Hermosillo, Mexico.
2. First, I was transported 175 miles to Nogales, AZ by truck for packaging and distribution.
3. Next, I was transported 551 miles to Coast Foods in Los Angeles, CA by truck for distribution.
4. Then I was transported 1,693 miles to the Hy-Vee Distribution Center in Ankeny, IA by truck for distribution.
5. Then, I was transported 201 miles to the Hy-Vee in Rochester, MN by truck for distribution.
6. Last I traveled 3 miles from the Hy-Vee to your plate after you purchased me for dinner.

Corn

1. I was grown at a farm owned by Foxy Produce Inc. in San Joaquin, CA where I was picked and packaged.
2. First, I was transported 124 miles to Salinas, California by truck for cold storage.
3. Next, I was transported 1,897 miles to the Hy-Vee Distribution Center in Ankeny, IA by cargo plane for distribution.
4. Then, I was transported 201 miles by truck to the Hy-Vee store in Rochester, MN for distribution.
5. Last, I traveled 3 miles from Hy-Vee to your plate after you purchased me for dinner.

Non-Local Salad Food Clue Cards

Honey

1. I was made in bee hives at a farm near San Luis Obispo, CA.
2. First, I was transported 226 miles to the Sue Bee Honey Factory in Anaheim, CA by truck where I was bottled and labeled for distribution.
3. Then, I was transported 1,667 miles to the Hy-Vee Distribution Center in Cherokee, IA by truck for distribution.
4. Then, I was transported 235 miles by truck to the Hy-Vee store in Rochester, MN for distribution.
5. Last, I traveled 3 miles from Hy-Vee to your plate after you purchased me for dinner.

Vinegar

1. I was made with grapes in Montebello, CA.
2. First, I traveled 316 miles to the Fleishmann Vinegar processing plant in Montebello, California where I was bottled and labeled.
3. Then, I was transported 1,671 miles to the Hy-Vee Distribution Center in Cherokee, IA by truck for distribution.
4. Then, I was transported 235 miles by truck to the Hy-Vee store in Rochester, MN for distribution.
5. Last, I traveled 3 miles from Hy-Vee to your plate after you purchased me for dinner.

PACED Decision-Making Model

PROBLEM What problem must I solve? Record the problem below.

CRITERIA What values are important to me? List the important values (also known as criteria).

ALTERNATIVES What choices do I have? You can purchase either a local salad or non-local salad.

Write the three most important criteria for making your salad selection in the top row of the chart. Add details for each criteria for the local salad and non-local salad to complete each of the empty boxes in the chart.

	Criteria 1	Criteria 2	Criteria 3
Alternative 1 – Local Salad			
Alternative 2 – Non-Local Salad			

EVALUATION Which alternative best meets my criteria? Why?

DECISION Which salad will you purchase? Why is this a good decision for you?