

# Nutrition

Food →

energy and building blocks



# Food for Plants

- Building blocks =
- N (nitrogen), P (phosphorus), K (potassium)
  
- Energy for plant =
- Sunlight

# Food for animals

- Proteins, carbohydrates, fats
- vitamins and minerals (Fe, Ca)
  
- Failure to get the right food → failure to maintain homeostasis →
- disease

# Standard American Diet



# What makes up most of the standard American diet?

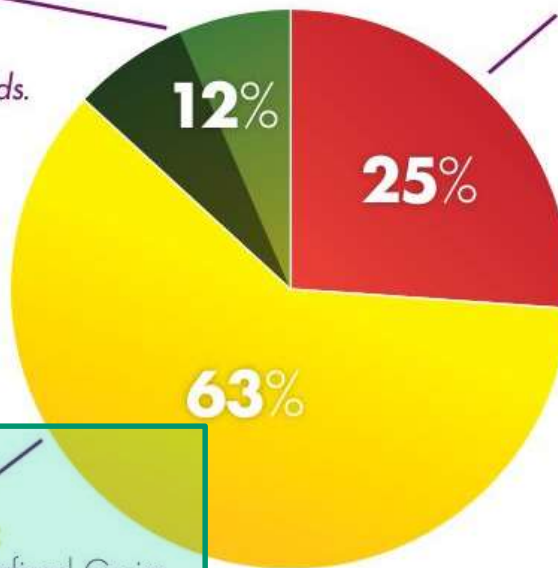
## PLANT FOOD:

Vegetables, Fruits, Legumes, Nuts & Seeds, Whole Grains  
**Fiber is only found in plant foods.**

**NOTE:** Up to half of this category may be processed, for example almonds in candy bars, apples in apple pies or spinach in frozen spinach soufflé, and of course these would not be healthy choices. The focus should be on whole unprocessed vegetables, fruits, legumes, nuts and seeds and whole grains.

## PROCESSED FOOD:

Added Fats & Oils, Sugars, Refined Grains



## ANIMAL FOOD:

Meat, Dairy, Eggs, Fish, Seafood  
**Cholesterol is only found in animal foods.** Animal foods are the **PRIMARY** source of saturated fat.

## GUIDE TO HEALTHY EATING:

Much easier to understand than the USDA Food Pyramid, with no food industry influence.

Eat **LESS** from the animal and processed food groups and **MORE** whole foods from the plant food group.

In general, food from the animal and processed food group contribute to disease, while **WHOLE** foods from the plant group contribute to good health.

Source: USDA Economic Research Service, 2009; [www.ers.usda.gov/publications/EIB33](http://www.ers.usda.gov/publications/EIB33); [www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm#calories](http://www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm#calories)

New York Coalition for Healthy School Food \* [www.healthyschoolfood.org](http://www.healthyschoolfood.org)

Special thanks to Joel Fuhrman, MD, author of *Disease Proof Your Child: Feeding Kids Right* \* Graphics by Michelle Bando.com

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# What should we eat more of and less of to maintain a healthy diet?

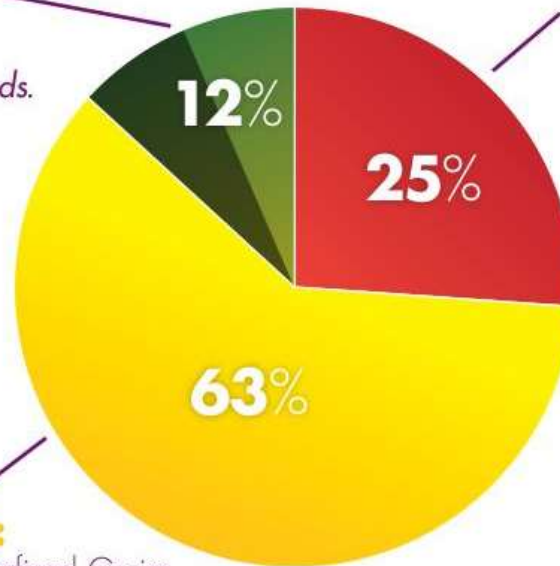
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# Define Processed foods



High in :

- sugar
- salts
- fats and oils
- Refined grains

Low in:

- Vitamins
- Minerals
- Building blocks



**SURGEON GENERAL'S**

**WARNING:**

The Standard American Diet causes approximately two-thirds of the deaths due to disease in America.

- <https://www.youtube.com/watch?v=Yda8RtOcVFU>

# What has happened to obesity rates in the US since the 1980s?

Sex, age, race and Hispanic origin <sup>1</sup> , and percent of poverty level	Overweight or obese (BMI greater than or equal to 25.0) <sup>2</sup>				
	1988–1994	1999–2002	2003–2006	2007–2010	2011–2014
20 years and over, age-adjusted <sup>3</sup>			Percent of population		
Both sexes <sup>4</sup> . . . . .	56.0	65.1	66.7	68.5	69.5

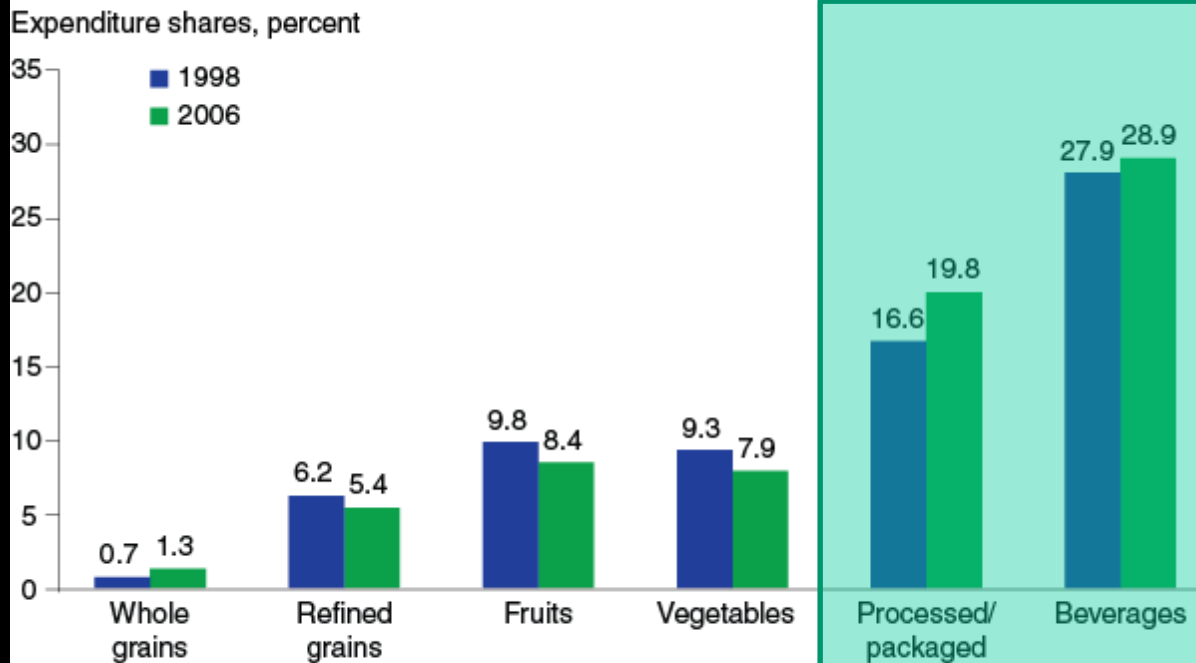
<http://www.cdc.gov/nchs/fastats/obesity-overweight.htm>

# Approximately what percentage of Americans were obese in 2014

<i>Sex, age, race and Hispanic origin<sup>1</sup>, and percent of poverty level</i>	<i>Overweight or obese (BMI greater than or equal to 25.0)<sup>2</sup></i>				
	<i>1988–1994</i>	<i>1999–2002</i>	<i>2003–2006</i>	<i>2007–2010</i>	<i>2011–2014</i>
20 years and over, age-adjusted <sup>3</sup>			Percent of population		
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# Which foods are Americans purchasing more of

At-home whole grain purchases by U.S. households increased between 1998 and 2006, but fruit and vegetable purchases fell



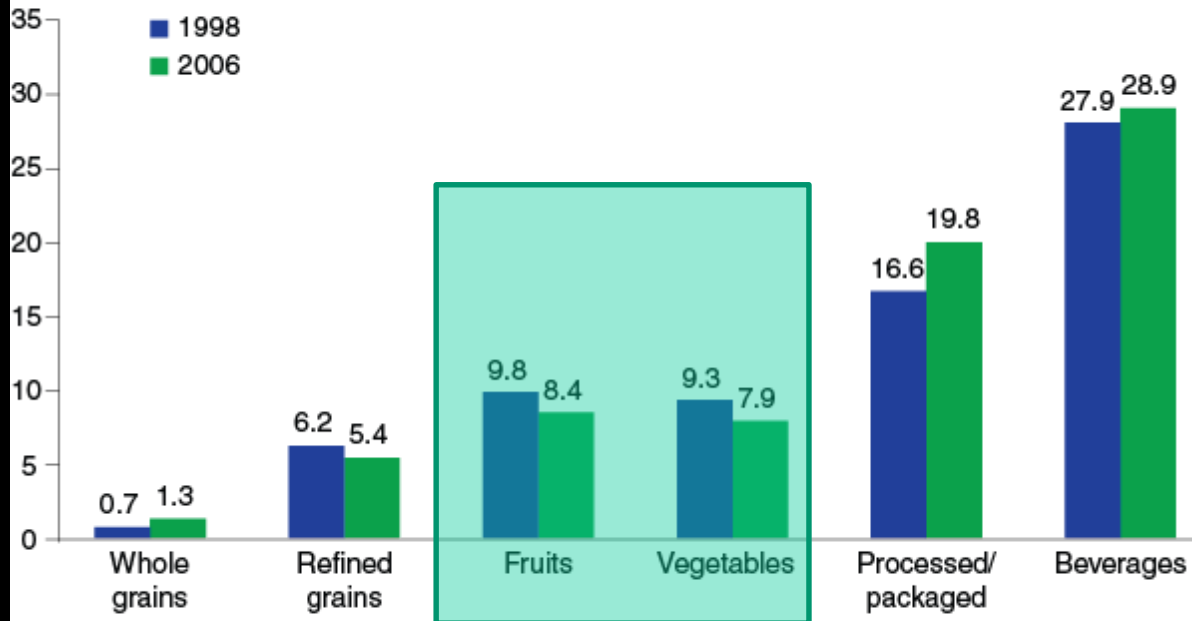
Note: Packaged and processed foods includes frozen or refrigerated entrees, soups, candies, and prepared foods not included in the whole and refined grains categories.

Source: USDA, Economic Research Service calculations using Nielsen Homescan data.

# Which foods are Americans purchasing less of

At-home whole grain purchases by U.S. households increased between 1998 and 2006, but fruit and vegetable purchases fell

Expenditure shares, percent



Note: Packaged and processed foods includes frozen or refrigerated entrees, soups, candies, and prepared foods not included in the whole and refined grains categories.

Source: USDA, Economic Research Service calculations using Nielsen Homescan data.

# Make a claim based on evidence

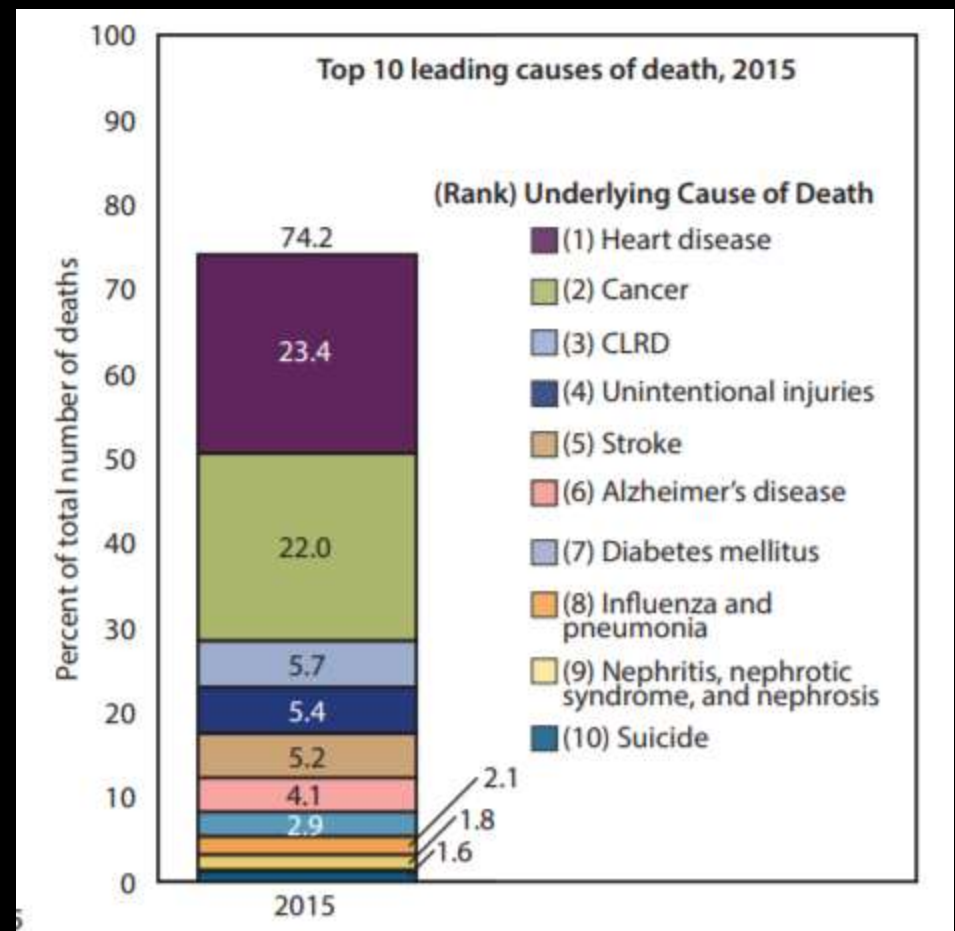
- During that same time what happened to obesity rates
- Increase
- Relationship between processed foods and obesity rates
- Increase processed foods → increase in obesity



# Most deaths in the US are diet related

Diet related diseases include:

- Heart disease
- Cancer
- Stroke
- Diabetes





**1 out of 3 children**

born in the year 2000 will develop  
diabetes in their lifetime.<sup>1</sup>



Describe the relationship  
between Cancer and sugar

“Today, about half of all American adults—117 million people—have one or more preventable, chronic diseases, many of which are related to poor quality eating patterns..”

<https://health.gov/dietaryguidelines/2015/guidelines/executive-summary/>

# List 2 dietary factors that can cause autoimmune diseases

**Table 1**

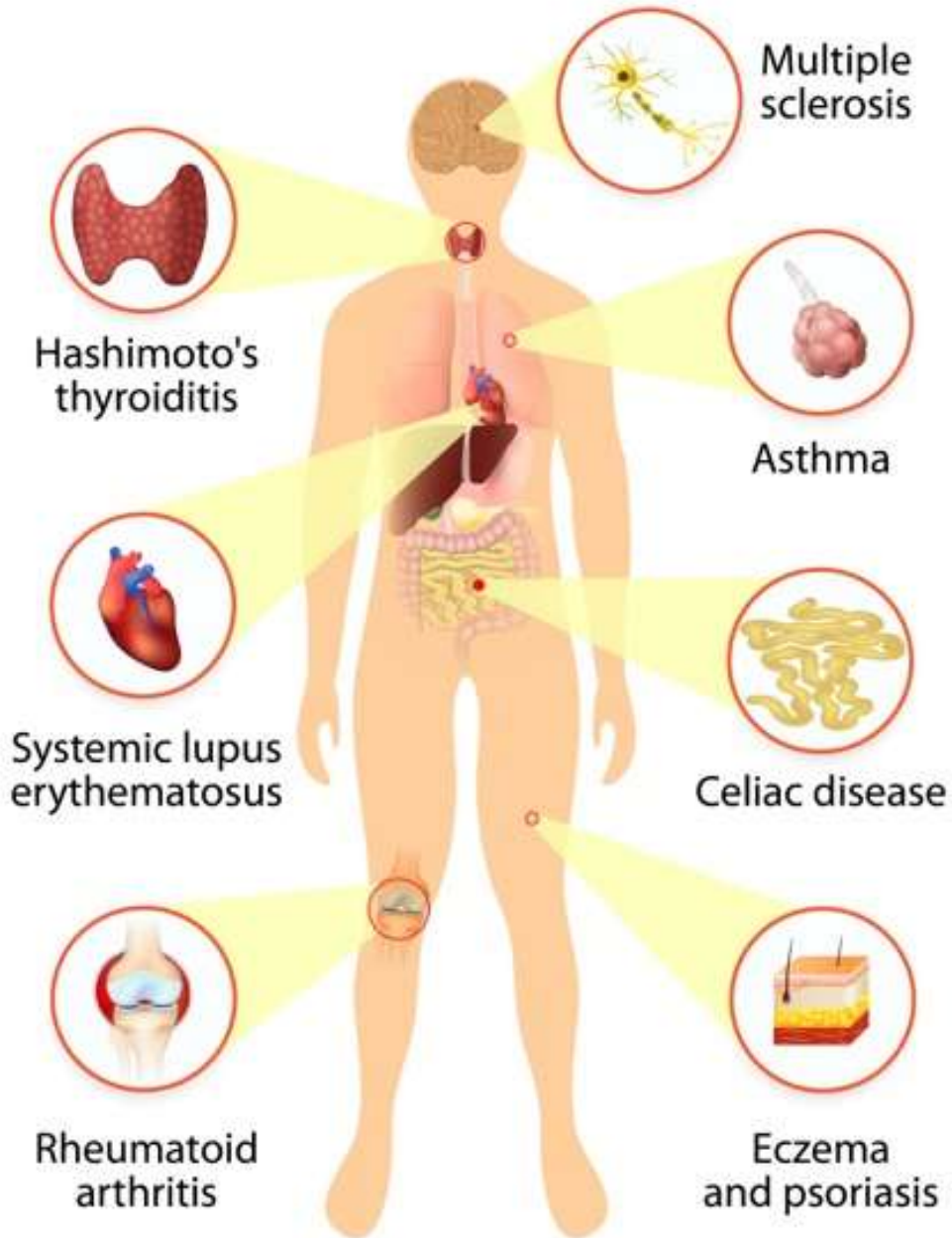
Studies testing dietary interventions in models of autoimmune diseases

Dietary factor	Disease model	Ref.	Overall effect	Putative mechanisms
Calorie restriction	EAE	[56]	Beneficial	Curtailed of leptin
Calorie restriction	EAE	[95]	Beneficial	Curtailed of leptin
PUFA	EAE	[96]	Beneficial	PPAR- $\gamma$ induction
Olive oil and polyphenols	DIC	[97]	Beneficial	PPAR- $\gamma$ induction
Fish-oil	CIA	[98]	Beneficial	Macrophage function
Green tea extract	EAE	[99]	Beneficial	NF $\kappa$ B inhibition
High-fat diet	IBD	[50]	Detrimental	Unknown
High-fat diet	CIA	[51]	Detrimental	T <sub>H</sub> 17 induction
High-fat diet	EAE, TNBS Colitis	[44]	Detrimental	T <sub>H</sub> 17 induction
High-salt diet	EAE	[74]	Detrimental	T <sub>H</sub> 17 induction
High-salt diet	EAE	[73]	Detrimental	T <sub>H</sub> 17 induction
Trans fatty acids	DIC	[100]	Detrimental	T <sub>H</sub> 17 induction

EAE Experimental autoimmune encephalomyelitis, CIA collagen-induced arthritis, DIC DSS-induced colitis.

Manzel, Arndt et al. "Role of Western Diet in Inflammatory Autoimmune Diseases." *Current allergy and asthma reports* 14.1 (2014): 404. *PMC*. Web. 5 Jan. 2018.

# AUTOIMMUNE DISEASES





# Costa Rica









# Life Expectancy by Country

## 2017 census data

<b>Costa Rica</b>	
Finland, Canada, Ireland	
France, New Zealand, Israel, Sweden	
Hong Kong, Italy, Japan	
US	









Arturo





















# Youth Climate Team in Finland





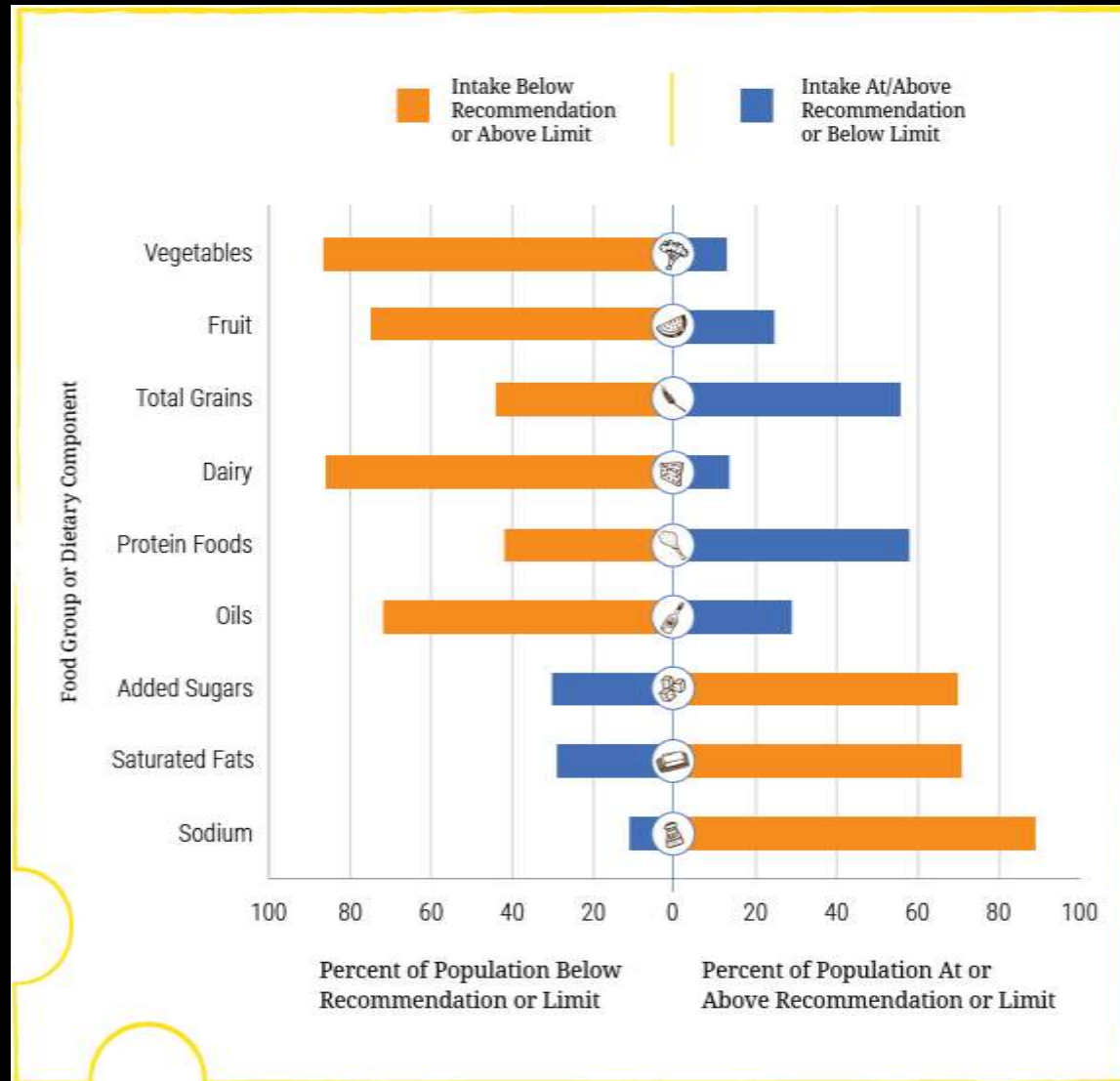






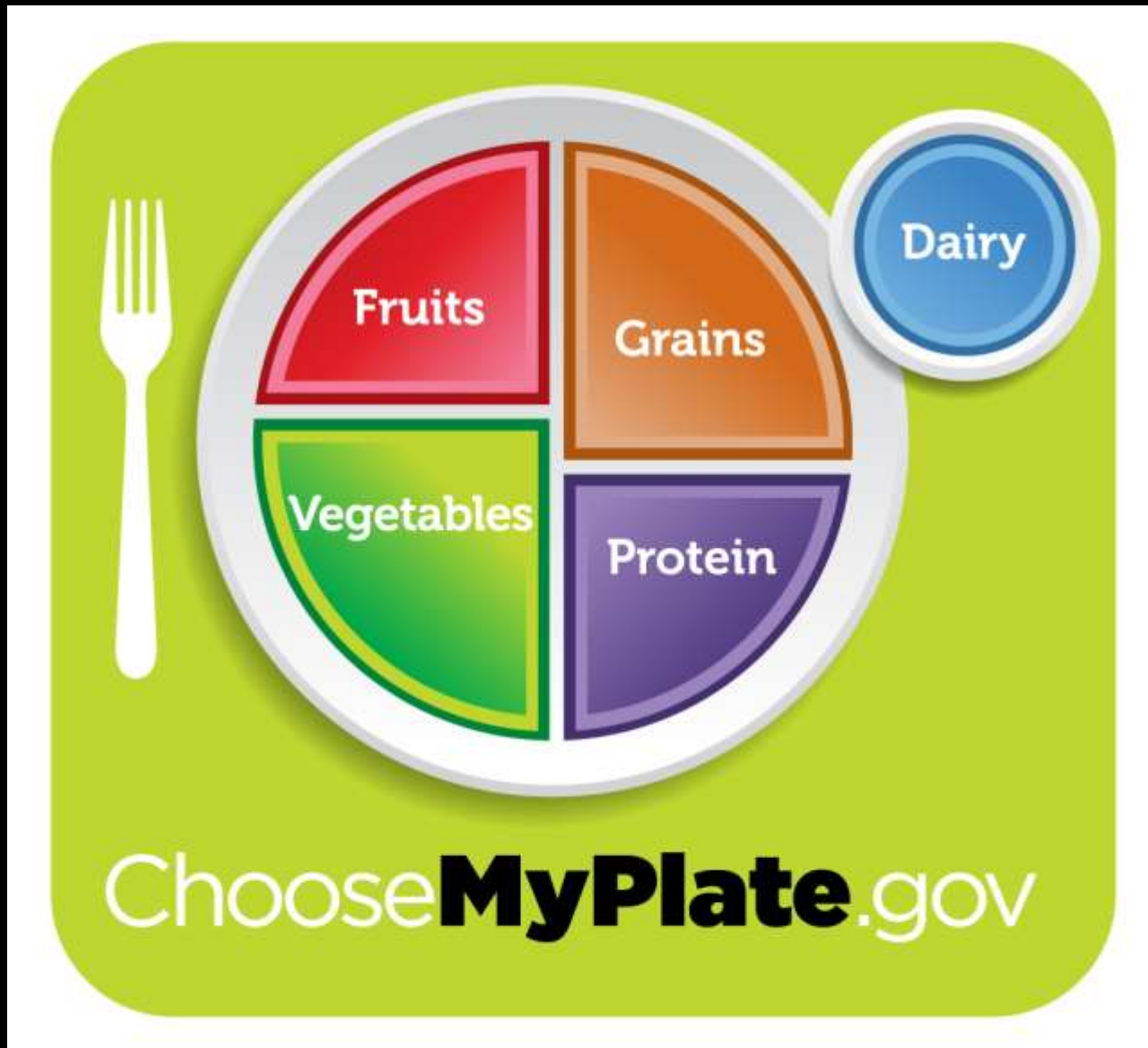
Healthy diets =  
whole foods diet

# Describe the dietary shifts needed to align our meals with healthy eating guidelines





# 2010 USDA Guidelines



# School Lunches





Curing MS and other chronic  
diseases with diet



# 3 cups green leaves daily

- Ex: Kale, spinach, lettuce
- Provide vitamins B, A, C and potassium
- Note Kale = most nutritious





# 3 cups Sulfur Rich Vegetables

- Ex: cabbage, broccoli, turnips, rutabagas, onions, garlic, mushrooms, asparagus
- Needed for mitochondrial health →  
**MORE ENERGY**





# 3 Cups Colors

- Carrots, beets, red peppers
- Raspberries, strawberries, blueberries
- Lots of vitamins and antioxidants  
(prevent cell damage associated with cancer)

# High Quality Proteins

- Ex: Salmon, herring, grass fed meat
- Omega 3 fatty acids needed for brain tissue development

Dan Coffrin  
LPHS student





# Whole Grains

- Whole grain wheat, barley, brown rice, oats, rye, amaranth, quinoa
- Complex carbohydrates and fiber → aids in digestion , decreases heart disease and diabetes

# Inuit Diet= Whole Foods Diet Elijah and Naomi



















# Hunter/Gatherer and Whole Foods Diets

- Advantages
  - healthier
  - More sustainable





# Define Sustainable

- Good for people
- Good for economies
- Good for environment
- Now and for future generations

Where does most of the Standard American Diet come from?



# Industrial farms





# Which is healthier?



# Which is easier to produce?



# Which is more sustainable?





Big Mac = \$3.99  
extra value meal \$5.49



1 head of organic broccoli from  
a farmers market = \$3.49



Why is it more expensive to eat locally produced organic food?

- Government gives funding to industrial farms
  - Small farmers can't compete





The Green Revolution = Shift  
in food production began  
in the 1960s



# Describe the shift in food production



# Describe the shift in food production

- Monocultures
- Chemical fertilizers
- Pesticides (chemicals to kill pests)
- Genetically modified crops



# Describe the shift in animal production



**Weaned at 56 days then forage in a pasture supplement with kitchen and vegetable scraps**



**Weaned at 20 days then fed primarily corn and soy  
Antibiotics and hormones added to increase weight**

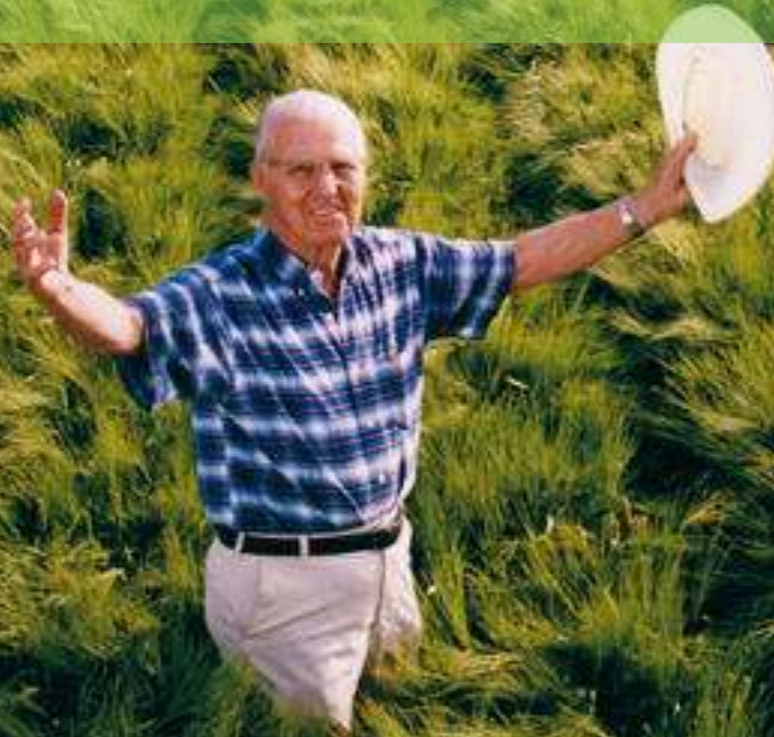
# Describe the shift in animal production

- Crowded living conditions
- Raised indoors with no exercise
- Add antibiotics and hormones
- Grain fed



# Good Results

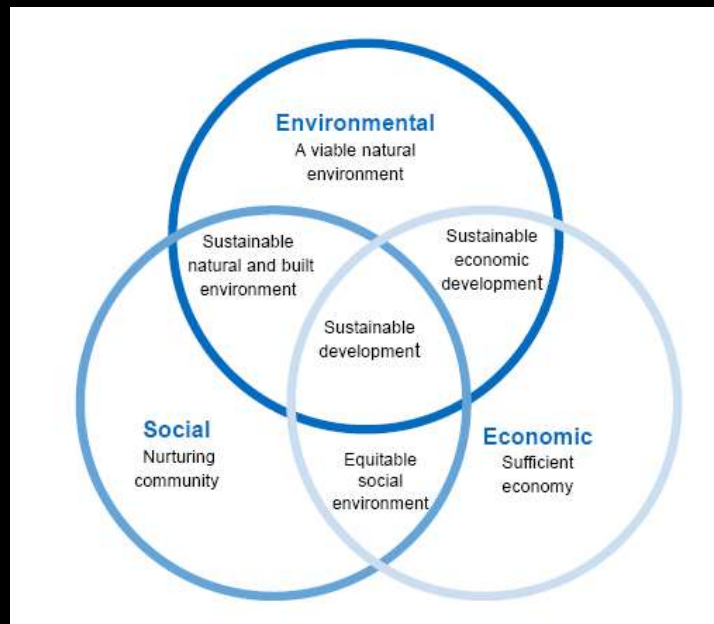
- Increased food production
- Cheap food for everyone





# Define Sustainable

- Good for present and future generations



**Why is the industrial food system unsustainable?**

The future of food will have to be  
creative







Essex farm



# Fledging Crow Farm





# North Branch Farm





# Harmony Hills Farmstead



# Half Share = \$110/month

- **Category A = 5 packages:** Ground Beef, Ground Pork, Ground Beef Patties (3/pack), Sweet Italian Sausage Links, Sweet Italian Sausage Bulk, Spicy Italian Sausage Links, Spicy Italian Sausage Bulk, Breakfast Sausage Links, Breakfast Sausage Bulk, Hickory Smoked Kielbasa, Frankfurter (hot dogs), Pint of Lard, Bar of Soap, Poultry Spice Rub.
- AND
- **Category B = 2 packages:** Center Cut Pork Chops, Hickory Smoked Pork Chops, Side Pork (sliced), Pork Tenderloin, Pork Cutlets, Pork Stew, Beef Stew, Beef Rib Steak, Top Sirloin Steak, Beef Sandwich Steak, Bone-In NYS Steak, Hickory Smoked Bacon, Hickory Smoked Canadian Bacon, Hickory Smoked Ham Steaks, Summer Sausage.
- AND
- **Category C = 1 package:** Pork Loin Roast, Pork Shoulder Roast, Fresh Pork Hocks, Hickory Smoked Pork Hocks, Hickory Smoked Ham Roast, Fresh Ham Roast, Pork Spare Ribs, Pork Country Style Ribs, Pork Baby-Back Ribs, Beef Chuck Roast, Top Round (London Broil), Osso Bucco, Beef Short Ribs.
- AND
- **Category D = Whole Chicken OR 3 Packages from Category A OR 4 Packs of Ground Beef**
- AND
- **Category E = 1 Dozen Eggs OR 1 Soap OR 1 Package from Category A**
- 
- SOAP: Oats & Honey (ground up vanilla bean inside), Winter Spice (Cinnamon-Clove-Sweet Orange), Garden Mint, Lavender, Lemongrass & Tea Tree (most popular), Grapefruit Poppy Seed, Cedarwood/Tea Tree (smells like a forest), Evergreen (Pine Tar with/Fir Needle Essential Oil), Soothing Evergreen (Pine Tar w/ Lavender Essential Oil), Baby Unscented, and Baby Creamy Carrot (great for sensitive skin types).

# Chemical fertilizers

- Environmental problems
  - Runoff into streams → algae blooms
  - Makes soil salty
- Alternatives
  - Compost
  - Rotate crops
  - Plant cover crops
  - USDA certified organic crops



5lbs food waste : 1 lb wood pellets





# Bacteria decomposers











214 lbs / week  
= 8,560 lbs / yr

Not going to a  
landfill

# Pesticides

- Ex: insecticides kill insects, herbicides kill weeds
- Environmental problems
  - Kill non target species
  - Can build up in food chains (bioaccumulate)
- Alternatives
  - Natural predators (like ladybugs and birds)
  - Use pheromone traps
  - Plant a diversity of crops → stability
  - USDA certified organic

# Describe a more sustainable food system

- Locally grown
- Lots of diversity
- No chemical fertilizers
- No pesticides
- Grass fed animals
- No hormones or antibiotics



# Define Nonrenewable

- Gets depleted or used up
- Example
- Fossil fuels (coal, oil, and natural gas)

# One More Problem with Industrial Farming

**Fossil fuels → Food**





# Fossil fuels used to → food

- Ex:
  - Tractors, fertilizers, pesticides, transportation, processing
- Env. problems
  - Deplete natural resources
  - Release CO<sub>2</sub> → global warming
  - Release air pollution → acid rain
  - Smoke → smog
- How can we use less fossil fuels
- Local foods
- Eat non processed foods

# Practice 8<sup>th</sup> grade science exam questions

# How many calories from fat

<b>Nutrition Facts</b>	
Serving Size: 1 cup (228g)	
Servings Per Container: 2	
Amount Per Serving	
<b>Calories</b> 250	Calories from Fat 110
% Daily Value *	
<b>Total Fat</b> 12g	18%
Saturated Fat 3g	15%
<b>Cholesterol</b> 30mg	10%
<b>Sodium</b> 470mg	20%
<b>Total Carbohydrate</b> 31g	10%
Sugars 5g	
<b>Protein</b> 5g	
Dietary Fiber 0g	0%
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

\* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less Than	65g	80g
Sat Fat	Less Than	20g	25g
Cholesterol	Less Than	300g	300g
Sodium	Less Than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g



# Lack of a balanced diet →

- Disease

# Increase in greenhouse gases

- Increased temperatures →
- Increased melting of polar ice caps

# Which energy source is nonrenewable

- Fossil fuels



# How many grams of fat in the entire box

<b>Nutrition Facts</b>	
Serving Size 1/2 cup (30g)	
Servings Per Container 9	
Amount Per Serving	
<b>Calories</b> 130	Calories from Fat 30
% Daily Value*	
<b>Total Fat</b> 3g	5%
Saturated Fat 0.5g	3%
<b>Cholesterol</b> 0mg	0%
<b>Sodium</b> 300mg	13%
<b>Total Carbohydrate</b> 21g	7%
Dietary Fiber 1g	4%
Sugars 1g	
<b>Protein</b> 4g	

- Grams of fat = 3
- Total servings per container = 9
- Total grams of fat =
- $3 \times 9 =$
- 27

Calories Used by a Small Dog While Running

Average Running Speed (km/h)	Calories Used per Hour
2	18
4	27
6	36
8	45

- What's happening to running speed in the table?
- What's happening to calories used?
- $18 + x = 27$
- $27 + x = 36$
- $36 + x = 45$
- $x = ?$

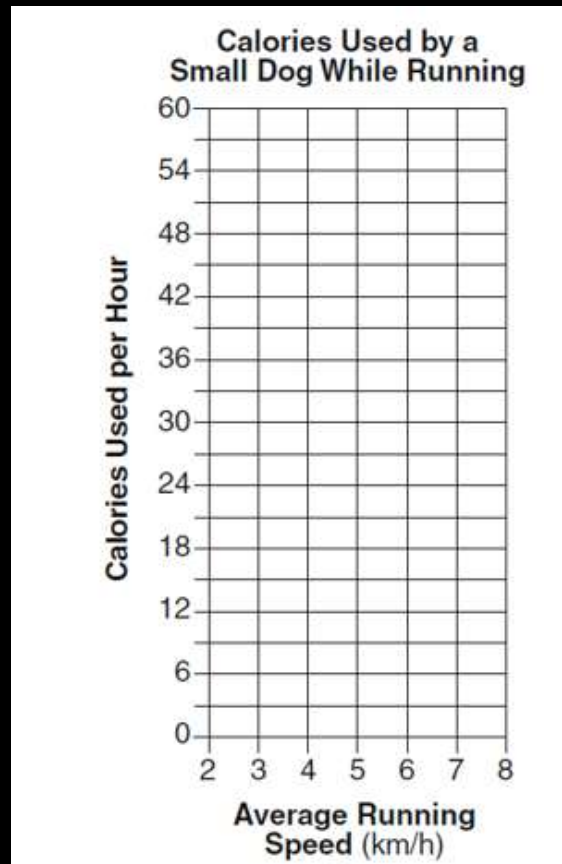
Calories Used by a  
Small Dog While Running

Average Running Speed (km/h)	Calories Used per Hour
2	18
4	27
6	36
8	45

- Calories used with average running speed of 10 =
- $45 + 9 =$
- 54



Construct a line graph (Follow instructions!!  
Do not extend your line past the points on  
your plot)



# Relationship questions

- As you increase \_\_\_\_\_ , then \_\_\_\_\_ will \_\_\_\_\_

# Experimental design questions

- Title = the effect of the I on the D
- The effect of (difference between your groups)
- Different plants
- on (the thing you will measure)
- amount of oxygen produced
- Independent variable =
- Dependent variable =



Hypothesis must include relationship between the independent variable and dependent variable