



Culinary Institute
of America

Day 2: Ingredient Identification



Learning Objectives

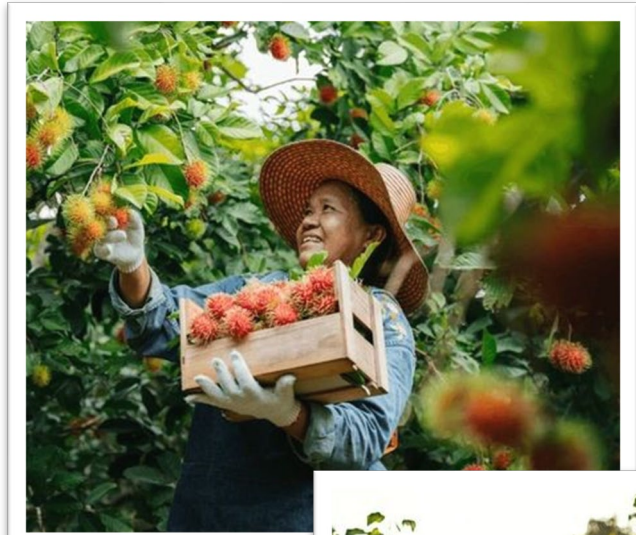
- Identify the different categories of vegetables and fruits.
- Understand the classifications and benefits of nuts, seeds, whole grains.
- List the forms and preparations of common meat alternatives.
- Identify essential macro and micronutrients.
- Understand best practices for prepping vegetables for consumption.
- Understand the ratios and methods for cooking grains.
- Define “smoke point” and distinguish plant-based oils for different cooking methods.
- Understand the benefits of herbs and spices.
- Prepare a variety of vegetarian dishes using standardized recipes.

Categories of Vegetables

1. **Leafy:** kale, spinach, lettuce
2. **Root:** carrots, beets, radishes
3. **Bulb:** onions, garlic, leeks
4. **Stem:** asparagus, celery, rhubarb
5. **Flower:** broccoli, cauliflower, artichokes
6. **Fruit:** tomatoes, bell pepper, eggplant
7. **Pod:** peas, green beans, okra
8. **Tuber:** potatoes, yams
9. **Seed:** corn, legumes
10. **Fungi:** mushrooms



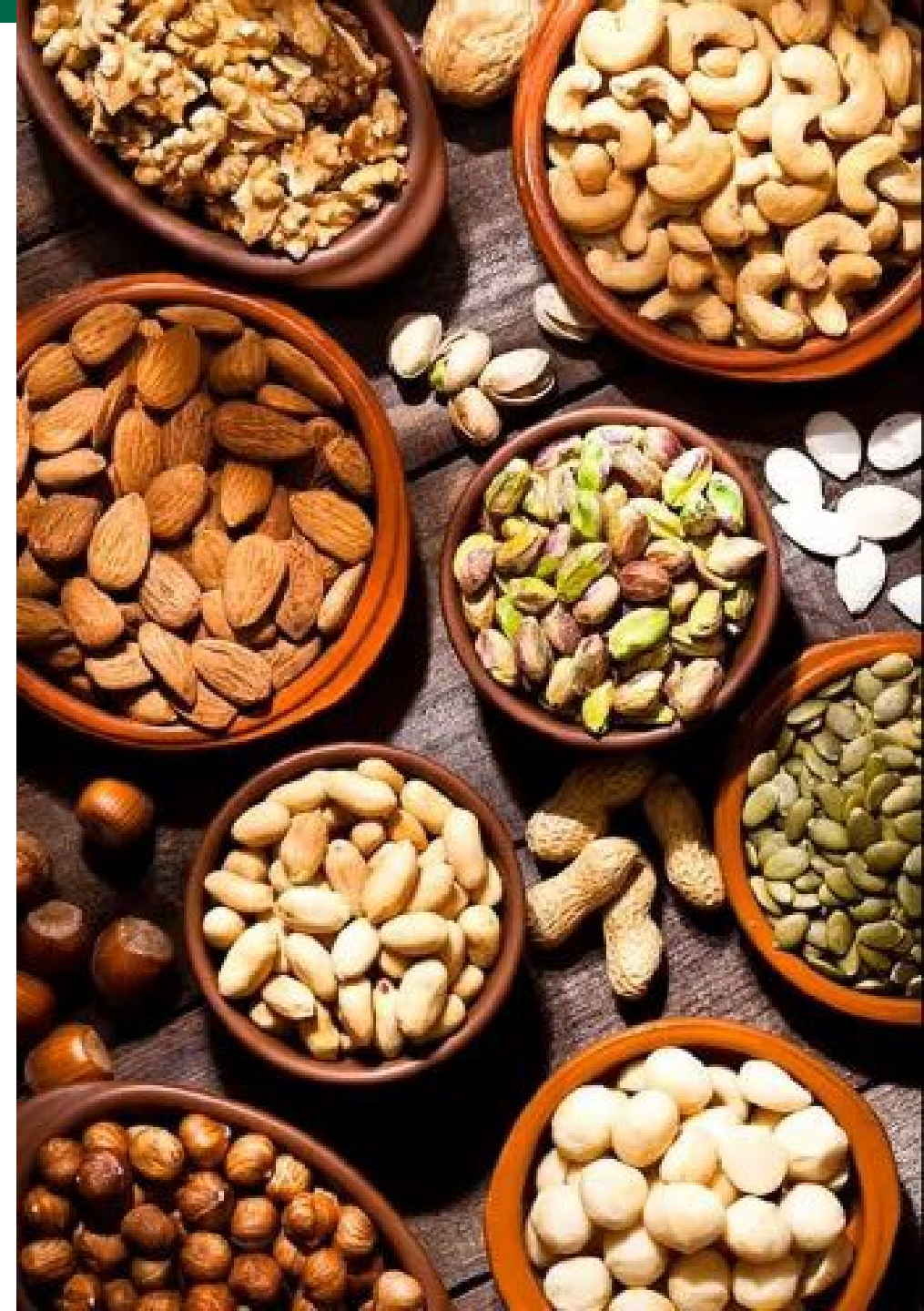
Categories of Fruits



- 1. Simple:** from one ovary of a single flower; plums, peaches, walnuts, hazelnuts
- 2. Aggregate:** from one flower with multiple ovaries creating small, tightly grouped fruit; raspberries, blackberries, strawberries
- 3. Multiple:** when the ovaries of many flowers merge to create a single larger fruit; pineapples, figs, breadfruit

Nuts & Seeds

- Botanically, nuts are fruits
- Culinarily, nuts are any oily kernel found in a shell
- Many common “nuts” are seeds, like almonds, cashews, walnuts, & pecans
- Nuts & seeds can be butters, pastes, milks
- Can make animal product alternatives, like cashew cheese & spreads
- Contain healthy fats, fiber, & protein



Whole & Processed Grains



- Grains are the seeds of grasses, AKA cereals
- Examples include wheat, oats, rice, barley
- Has fiber, vitamins, minerals, & antioxidants
- Help control cholesterol levels, weight, & blood pressure
- Can lower risk of diabetes & heart disease
- Ancient grains like spelt, einkorn, barley, & buckwheat, etc. tend to be less processed
- Whole grains are better than refined grains

Western Meat Alternatives

- **Eggs:** High-protein, readily available, substitutes are easy to find (e.g. JustEgg)
- **Jackfruit:** Similar texture to pulled pork/chicken, neutral flavor, low protein
- **Mushrooms:** Fleshy texture & mild taste can replace common meats; easily available, widely used



Eastern Meat Alternatives



- **Halloumi:** Cheese made with sheep's/goat's milk, used in salads
- **Paneer:** Spongy cottage cheese, can be stewed, curried, or breaded & fried
- **Tofu:** Soy-based bean curd, can be grilled, stir-fried, stewed, or baked into desserts
- **Tempeh:** Fermented soybeans pressed into a firm, cake-like block; popular in SE Asian cuisine

Daily Nutrition

- 6 essential nutrients are needed to maintain a healthy human body
- 1. **Carbohydrates:** 45-65% of daily calories
- 2. **Proteins:** 10-35% of daily calories
- 3. **Fat:** 20-35% of daily calories
- 4. **Water:** 6-8 cups (1.5-2L)/ day
- 5. **Vitamins**
- 6. **Minerals**



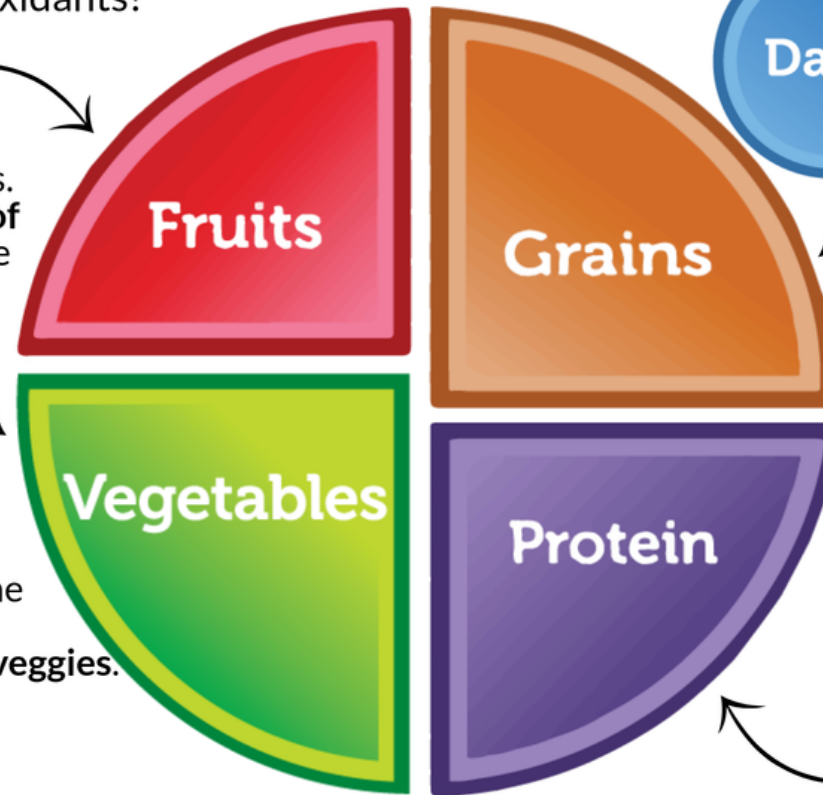
Daily Nutrition

MyPlate: A Guide

Make half your plate fruits and veggies. They're packed with fiber & antioxidants!

Fruit:
Eat fruits of all colors. Go for **fruit instead of juice**, which has more fiber and fewer calories.

Vegetables:
The more colors and types that you eat, the better! Aim to get mostly **non-starchy veggies**.



Dairy:
3 servings per day gets you the calcium you need. Choose low-fat for fewer calories.

Grains:
Eat mostly **whole grains**. Refined grains, like white bread and white rice, have less nutrition. Whole grains have more **fiber**, iron, and B vitamins.

Protein:
A palm-sized amount at lunch and dinner is all you need. Beans, nuts, fish, and chicken are good, lean choices.

Carbohydrates

- Needed in large amounts daily (macronutrient)
- Contains 4 kcal/ gram
- Breaks down into glucose
- Provides instant energy to the body & helps store energy
- **Dietary fiber:** promotes regularity, digestive health, and feeling full



Carbohydrates

Simple Carbs

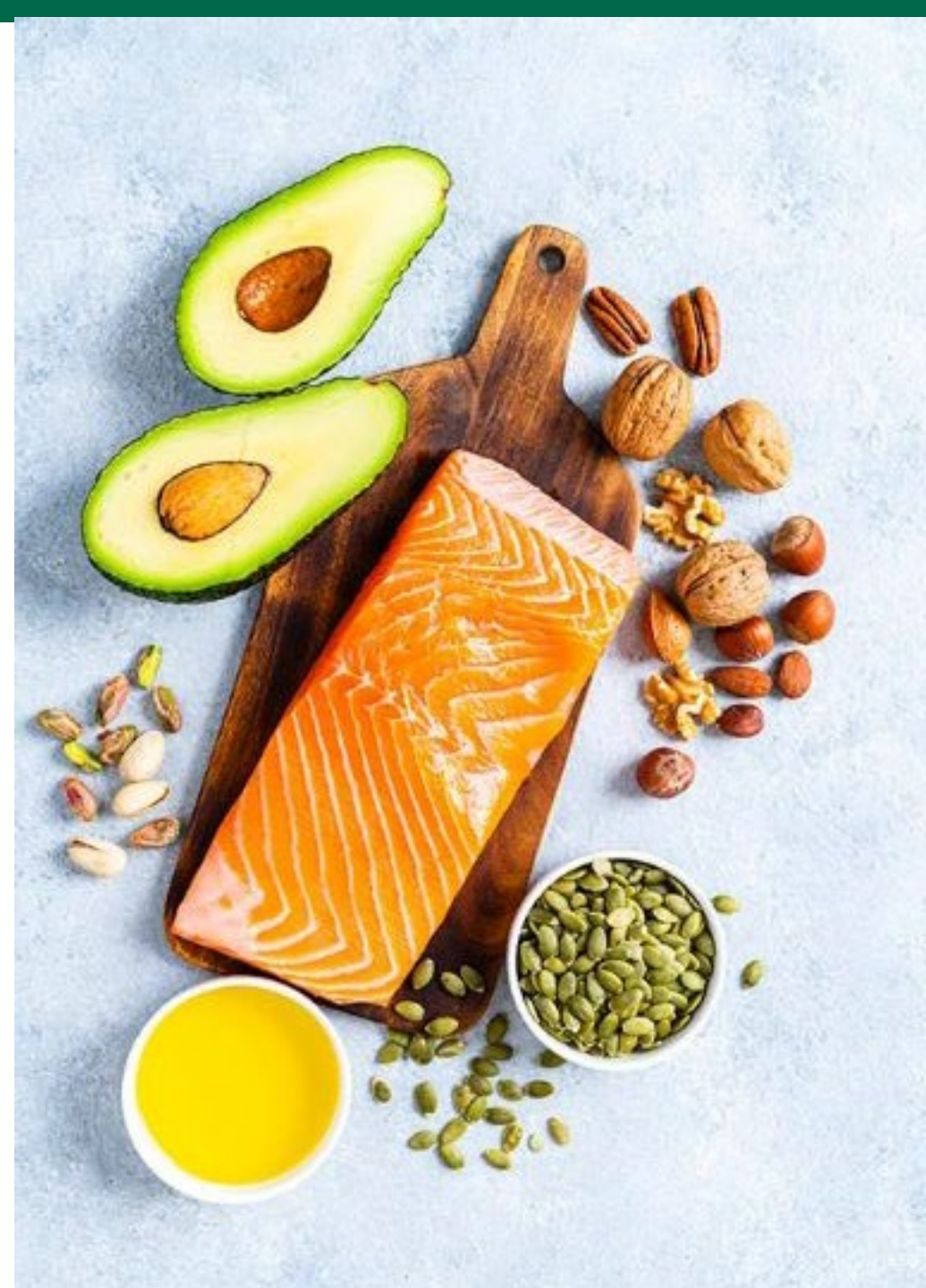
- Short chains of sugar molecules
- The most basic form of sugar
- Absorbed quickly into the bloodstream
- Spikes blood sugar levels
- **Types:** fructose, lactose, glucose
- **Foods:** table sugar, pasta, white bread, white rice, fruit juices

Complex Carbs

- Long chains of sugar molecules
- Absorbed slowly
- Raises blood sugar slowly
- Prevents sugar crashes
- Includes fiber
- **Types:** cellulose, glycogen, starch
- **Foods:** whole grains, apples, bananas, potatoes, beans

Fats

- Contains 9 kcal/ gram
- **Saturated:** increases LDL cholesterol, found in animal fats/ tropical oils
- **Unsaturated:** no effect on cholesterol, found in vegetable oils, nuts, fatty fish
- **Trans:** Most harmful form of fat, found in margarine, shortening, & some meat/ dairy products



Protein



- Is a macronutrient
- Contains 4kcal/ gram
- Supports bones, muscles, immune function, hormones, & skin repair
- **Complete proteins:** provides all 9 essential amino acids
- Found in meats, eggs, soy foods
- **Incomplete proteins:** are missing 1+ essential amino acid
- Found in grains, legumes, nuts

Vitamins

- Help fight infections, regulate hormones, & aid metabolic processes

Fat-Soluble Vitamin A: carrots, sweet potatoes, spinach

- Vitamin D: fortified milk, sunlight, fish
- Vitamin E: nuts, seeds, spinach
- Vitamin K: leafy greens

Water-Soluble

- Vitamin C: citrus fruits, bell peppers
- The 8 B-vitamins: grains, eggs, meat, legumes

VITAMIN CHART

VITAMIN	USE FOR	GOOD SOURCE
A	For healthy vision, skin, bones, teeth, & reproduction	Liver, Egg, Fish, Milk, Carrots, Sweet Potatoes, Pumpkin, Spinach
B1 THIAMIN	Helps convert food into energy and is critical for nerve function	Wheat, Rice, Watermelon, Tomatoes, Spinach, Soybeans, Beans, Yogurt, Fish
B2 RIBOFLAVIN	Helps convert food into energy and supports healthy skin, hair, blood, & brain	Dairy, Meat, Leafy Greens, Fortified Wheat, Soybeans, Yogurt, Salmon, Chicken, Beans
B3 NIACIN	Helps convert food into energy and is essential for healthy nervous system	Beef, Chicken, Turkey, Avocado, Nuts, Tuna, Tomatoes, Spinach, Bananas
B6 PYRIDOXINE	Helps make red blood cells and improves sleep, memory & mood	Chicken, Tuna, Bananas, Watermelon, Fish, Legumes, Potatoes, Leafy Greens
B7 BIOTIN	Helps convert food to energy & keeps skin healthy	Whole Grains, Eggs, Avocados, Soy, Fish, Nuts, Salmon, Milk
B9 FOLATE	Helps for new cell creation and DNA synthesis	Legumes, Spinach, Leafy Greens, Citrus, Tuna, Apples, Peas, Soybeans, Beans
B12	Breaks down fatty acids & amino acids, helps make red blood cells	Dairy, Beef, Pork, Poultry, Fish, Eggs, Liver, Fortified Cereals
C	Acts as an antioxidant, helps make new cells, & improves immune system	Fruit, Fish, Eggs, Bell Peppers, Broccoli, Tomatoes, Spinach, Apples, Potatoes, Citrus
D	Strengthens and helps form bones & teeth via calcium & phosphorus	Egg Yolk, Tuna, Fish Liver, Sunlight, Soybeans, Red Meat, Eggs, Milk, Fortified Cereals
E	Acts as an antioxidant, helps regulate cell membranes	Nuts, Avocados, Tuna, Whole Grains, Seeds, Almonds, Pumpkin, Soybeans, Beans
K	Essential for blood clotting and helping to regulate blood calcium	Broccoli, Brussels Sprouts, Liver, Leafy Greens, Soy, Carrots, Onions, Cabbage, Lettuce

Essential Minerals

- Supports bone health, fluid balance, muscle contractions, & nerve transmission

Macro (> 100mg/ day)

- Calcium: dairy, tofu, leafy greens
- Potassium: bananas, potatoes, beans
- Magnesium: nuts, seeds, whole grains

Micro (< 100mg/ day)

- Iron: red meat, lentils, spinach
- Zinc: meat, shellfish, legumes



Water



- Is a macronutrient
- Maintains cell shape & structure required for the body
- No nutritional value but carries nutrients throughout the body
- Recommended 6-8 cups daily
- Fruits & vegetables also contain water & help hydration
- **Water-rich foods:** watermelon, strawberries, cucumber, tomatoes, bell peppers, grapefruit

Phytochemicals & Antioxidants

Phytochemicals

- AKA “plant nutrients”
- Improve cell function & protect from damage
- Reduce risk of certain diseases/ cancers
- Related to plant pigment & flavor (polyphenols, carotenoids, terpenoids)

Antioxidants

- Reduce cell damage from waste (free radicals)
- Reduce risk of chronic diseases
- Improve immune function



Eat the Rainbow

“When diet is wrong, medicine is of no use. When diet is correct, medicine is of no need.”

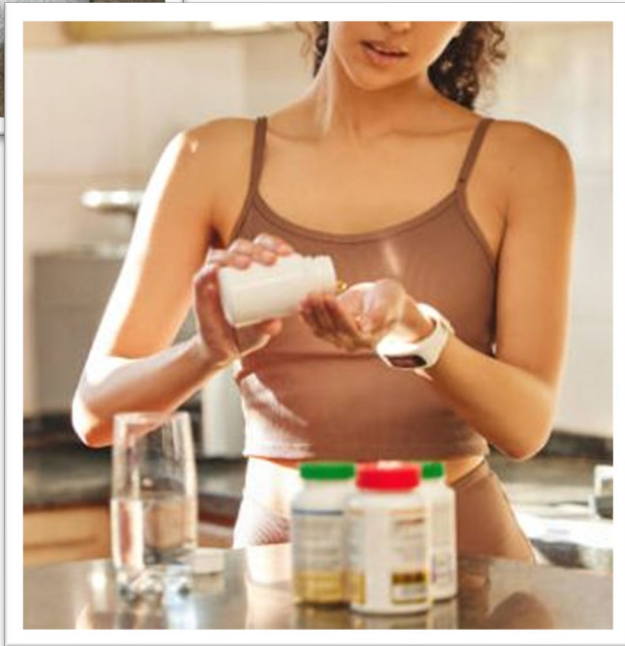
- *Ayurvedic Proverb*

WHY YOU SHOULD EAT THE RAINBOW

CONSUMING A VARIETY OF FOOD TYPES AND COLOURS IS REPRESENTATIVE OF A DIVERSE NUTRIENT INTAKE

GREEN		Vitamin K, Potassium, Lutein, Zeaxanthin, Vitamin C, Folate, Chlorophyll
RED		Vitamin C, Anthocyanins, Phenolics, Lycopene, Calcium, Vitamin D, Flavanol, Resveratrol, Folate
BLUE		
PURPLE		
YELLOW		B-Carotene/Vitamin A, Vitamin C, Potassium, Folate, Bioflavonoids
ORANGE		
WHITE		Potassium, Allium, Allicin, Anthocyanidins

Dietary Supplements



- ~70% of Americans use dietary supplements
- Supplies vitamins, minerals, proteins, herbs, botanical essences
- Can be used to fill nutrient gaps/ deficiencies
- Should be taken under doctor recommendation & supervision

Preparing Plant Foods

- Cook foods high in water-soluble vitamins in less water
- Use vegetables as thickeners & binders in soups/ sauces
- Edible peels provide nutrients & fiber; avoid unnecessary peeling
- Steaming, pressure cooking, stir-frying, & sous-vide preserve nutrients
- High heat can destroy vitamins & create free radicals



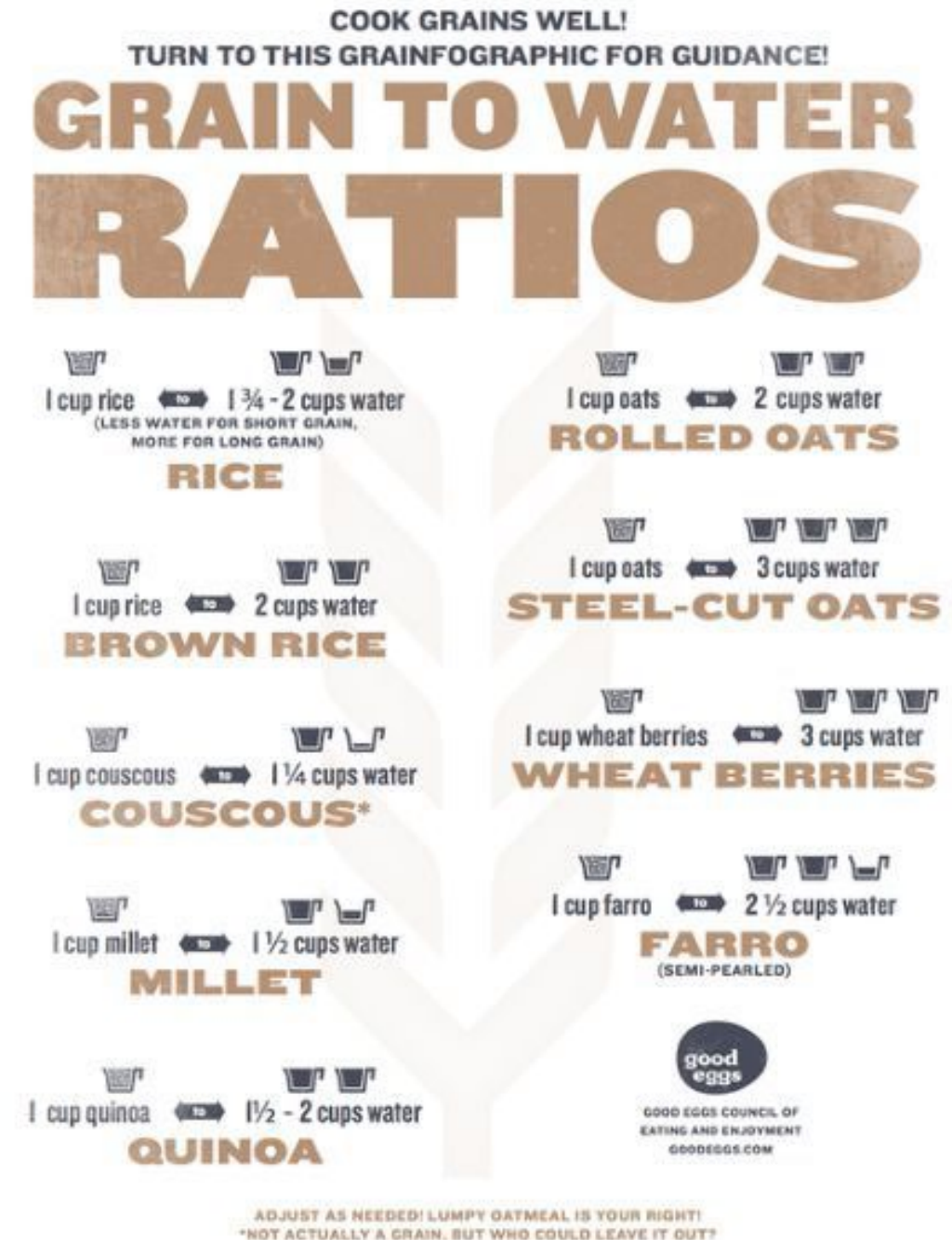
Grilling & Smoking

- Using minimal fats/ oils is healthier
- Grilling helps vegetables retain nutrients
- Smoked/ charred foods may contain carcinogenic compounds
- Avoid overcooking food items on the grill, discard burnt ends
- Thinly cut vegetables & meat substitutes to expedite cooking
- Grill with gas, not charcoal



Cooking Grains

- Common methods are steaming & boiling
- Cooking time varies by desired texture
- Water & stock are common cooking liquids
- Grains such as whole barley & wheat berries require soaking to soften the outer layer
- Toasting grains before cooking can increase depth of flavor



Plant-Based Oils



- Plant oils high in unsaturated fat can help increase satiety
- Oils high in saturated fat should be consumed in moderation
- **Smoke point:** the temperature where oils begin to break down
- Canola & avocado oil best for stir-frying
- Olive oil & coconut oil best for sautéing

Herbs & Spices

- Herbs & spices add flavor without adding calories, fat, or salt
- Use global cuisines for inspiration
- **Delicate herbs:** basil, cilantro, dill; for marinades, salads, vinaigrettes
- **Sturdy herbs:** bay leaf, rosemary, thyme; for soups, sauces, braises
- Higher sodium, unhealthy ingredients often found in prepared varieties





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Day 3: Sourcing, Storage, & Meal Planning

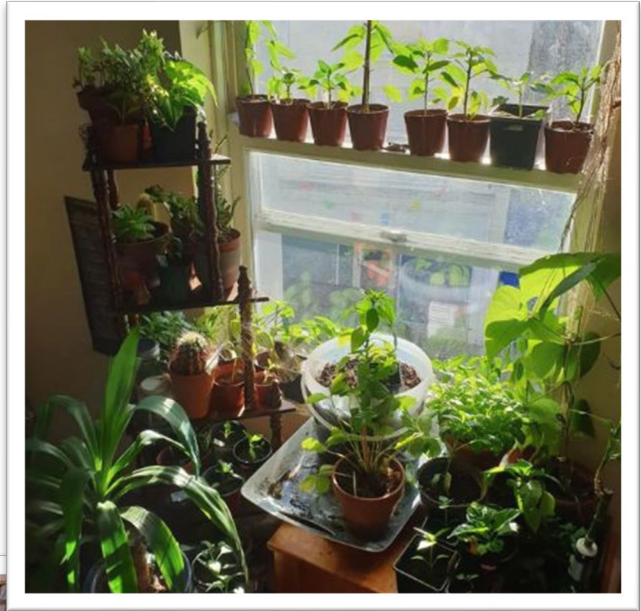


Learning Objectives

- Understand the methods of sourcing plant-based foods.
- Distinguish between the different types of food production.
- Understand how to store produce to prevent oxidation and premature spoilage.
- List the different methods of food preservation and how to store them.
- Understand how to plan, prep, and cook vegetarian meals for optimal nutrition, presentation, originality, and flavor.
- Prepare grains, vegetables, and sauces in advance.

Sourcing Plant-Based Ingredients

- **Search locally:** Farmer's markets, small grocers, or "local" sections in a grocery store
- **Visit farms:** Purchase produce, dairy, & eggs at lower prices
- **Community Supported Agriculture:** Buy a share & get produce during the growing season
- **Consider seasonality:** Produce is cheaper & more flavorful during its season
- **Remember sustainability:** Consider the ethics of businesses you support
- **Grow it yourself:** Organic, cheap, trustworthy



Types of Food Production



- **Organic:** growing crops without synthetic chemicals; using natural fertilizers & pest control
- **Subsistence:** food production for the farmer's family; with little or no surplus for sale
- **Commercial:** large-scale farming focused on producing crops/ livestock for profit & market sale

Types of Food Production

- **Permaculture:** mimics natural ecosystems to create self-sufficient agriculture
- **Biodynamic:** a holistic farming method combining sustainability with spirituality
- **Hydroponic:** growing plants without soil, using nutrient-rich water solutions
- Hydroponic, organic, & permaculture are best to support plant-based diets



Storing Produce

- Properly storing produce reduces waste, improves flavor
- Store herbs wrapped in paper towels or held in water
- Avoid washing produce far in advance to increase shelf-life
- Store produce dry to slow spoilage
- Keep ethylene-producing fruits (apples, bananas, etc.) separately
- Store root vegetables away from sunlight

KEEP YOUR FRUITS & VEGETABLES FRESH

Countertop
Ripen at room temperature before placing in the fridge.

Peach, Pear, Cantaloupe, Tomato, Banana, Avocado, Orange

& These:
• Cucumbers
• Kiwis
• Mango
• Watermelon
• Nectarines
• Pineapple
• Plums
• Grapefruits

Fridge
Some fruits release ethylene gas that spoil vegetables, so store fruits separately in the fridge.

Grapes, Apples, Cherries, Berries, Lemon/Lime, Pepper, Brussel Sprouts, Cabbage, Broccoli

& These:
• Cilantro
• Parsley
• Spinach
• Kale
• Carrots
• Celery
• Raspberries
• Mushrooms

Pantry
Store these items in a cool, dry, dark place, such as your pantry.

Onion, Garlic, Sweet Potato, Potato, Pumpkin, Eggplant

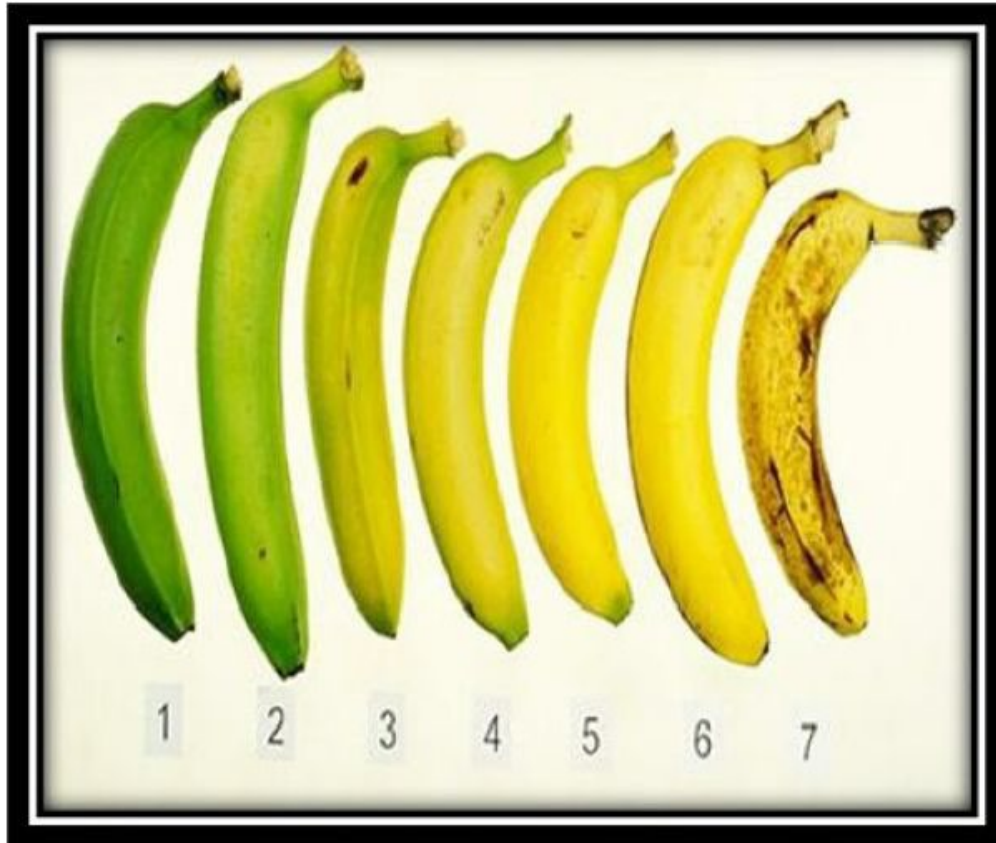
& These:
• Green beans
• Summer Squash
• Zucchini
• Basil
• Ginger
• Winter Squash

Freezer
Freezing fruits and veggies is a handy way to preserve them and reduce food waste.

Broccoli & other green veggies, Berries & Grapes, Veggie Bits for Soup Making

Cut & Put in Freezer:
• Asparagus
• Avocados
• Bananas
• Corn
• Leafy Greens
• Fresh Herbs
• Zucchini

Stages of Ripeness



- 1. Unripe:** Firm, green, sour, & bitter fruit
 - 2. Ripening:** Softer texture, sweeter flavor, & darker color
 - 3. Overripe:** Mushy, overly sweet/ sour, brown spots
- **Climacteric fruits:** bananas, tomatoes, mangoes, apples; continue ripening after harvest
 - **Non-climacteric fruits:** grapes, strawberries, citrus, pineapples; will not ripen after harvest

Oxidation

- **Enzymatic browning:** When cut fruits/vegetables turn brown when exposed to air
- Leads to breakdown of vitamins C, A, E
- Common in apples, bananas, avocados, potatoes

To avoid oxidation:

- Keep produce whole
- Submerge cut produce in water
- Store in cold airtight containers
- Coat produce in lemon juice
- Blanch produce before using



Preventing Food Spoilage

- **Proper storage:** Keep cold foods below 40 °F & dry goods in airtight containers
- **First In, First Out:** Use older stock before newer deliveries
- **Temperature control:** Cook, chill, & hold foods at safe temperatures
- **Control Inventory:** Pay attention to stock & avoid double buying foods
- Preventing food waste holds environmental, economic, & social importance



Methods of Food Preservation



- **Canning:** 1:1 ratio of vegetables to liquid
- **Pickling:** 1:1 ratio of vinegar to water
- **Fermenting:** 2-5% salt by the total weight of vegetables & water combined
- **Fruit preserves:** 1:1, 2:1, or 60%/40% ratio of fruit to sugar
- **Freeze-drying:** Can be eaten dried or rehydrated, retains 90% of nutrients
- Food preservation reduces costs, food waste, & increases food availability

Storing Canned Items

- Label & date the jars
- Store in a cool, dark, dry place
- Examine jars regularly for bulging, rusting, leaking, spoilage
- Store canned foods at 50-70°F or refrigerated at 35-38°F
- A HACCP plan must be in place for commercial establishments



Meal Prepping & Menu Planning



- Plant-based cooking often requires meal prepping
- Beans, some grains must be soaked in advance
- Chopping & cooking vegetables can be time consuming
- Grain bowls, soups, curries, roasted vegetables reheat well
- Plant-based menu planning should consider nutrient balance, originality, flavor

Prepping Cooking Grains

- Cooked grains can be stored under refrigeration for 3 days
- Add grains to soups, salad, and health bars for extra protein & fiber
- Common whole grains include quinoa, brown rice, farro, barley
- Cooking grains in bone broth adds protein, collagen, & minerals



Prepping Vegetables

- Vegetables should be washed, peeled, & trimmed close to consumption
- Cut vegetables can be stored in water/ an airtight container with a wet paper towel on top
- Cut vegetables uniformly for even cooking, texture
- Leave skin on when able
- Use vegetables of different colors for better presentation & more antioxidants



Cooking Vegetables



- Cook green vegetables without acid to preserve color
- Roots should always start in cold water
- Broccoli, spinach, lettuce lose up to 50% of their vitamin C when boiled
- 40% of B vitamins and minerals are lost during grilling/ broiling
- Short cooking times, reduced heat exposure are best
- Consuming vegetables raw allows for full absorption of nutrients

Prepping Sauces

- Vinaigrettes, relishes, pickles, chutneys can be homemade
- Store-bought products often contain higher sugar, sodium
- Prep and store sauces in air-tight glass jars
- Store in the refrigerator for 1 week and up to 3 months





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Any Questions?