

# CARBOHYDRATE COUNTING

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CLINICAL NUTRITION



## 2021 Virtual Diabetes Management Conference for School Nurses

Provided by Texas Children's Hospital

### **NURSING CONTINUING PROFESSIONAL DEVELOPMENT (NCPD)**

Texas Children's Hospital is approved with distinction as a provider of nursing continuing professional development (NCPD) by the Texas Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

### **REQUIREMENTS FOR SUCCESSFUL COMPLETION**

To receive contact hours for this nursing continuing professional development activity, the participant must:

- Register for the continuing professional development activity
- Attend at least one session
- Complete a pre and post survey
- Complete a participant evaluation online

Print and sign your contact hour "Certificate of Successful Completion" once you have completed the online evaluation.

### **LEARNING OUTCOME**

As a result of this professional development activity, 90% attendees will intend to integrate what they have learned into their professional practice and be able to name one concept learned on the post activity evaluation.

### **CONFLICTS OF INTEREST**

Explanation: A conflict of interest occurs when an individual has an opportunity to affect or impact educational content with which he or she may have a commercial interest or a potentially biasing relationship of a financial nature. All planners and presenters/authors/content reviewers must disclose the presence or absence of a conflict of interest relative to this activity. All potential conflicts are resolved prior to the planning, implementation, or evaluation of the continuing nursing education activity. All activity planning committee members and presenters/authors/content reviewers have had their Conflict of Interest assessed, identified and resolved by the nurse planner.

The activity's Nurse Planner has determined that the following planning committee member(s) and/or presenter(s)/author(s)/content reviewer(s) have a conflict of interest. Those conflicts of interest have been appropriately resolved.

- Planning Committee - Amber Smith – Ownership Interest in Tandem Diabetes Care

### **COMMERCIAL SUPPORT**

This NCPD activity has received no commercial support.

# OBJECTIVES

- Understand how to identify carbohydrates
- Learn how to carb count for meals and snacks
- Understand label reading and other methods to calculate carb counts
- Apply carb counting to manage blood glucose levels



# THE IMPORTANCE OF CARB COUNTING



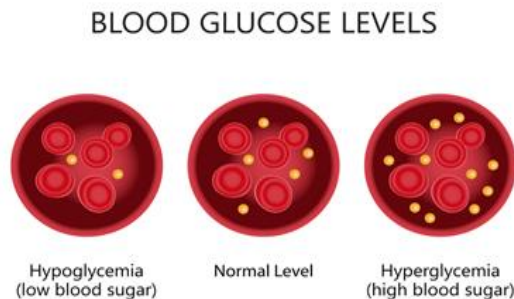
- **Studies show that people with better carb counting skills have better BG control.**
- **Counting carbs is the best way of keeping blood sugars under control-** better than limiting sugars, counting calories or using an exchange system.
- **Inaccurate carb counting can lead to low blood sugars or hyperglycemia** by wrongly estimating insulin before meals.
- **Inaccurate carb counting is also associated with higher blood sugars after meals.** Adolescents with the most accurate carb counting skills (less than 10g off) had better BG control and a lower A1C.

# WHY COUNT CARBOHYDRATES?

Food is made up of many different nutrients:

- Carbohydrate
- Protein
- Fat
- Vitamins & Minerals
- Water
- Fiber

- Our bodies need a little bit of each of these nutrients but someone with diabetes needs to pay close attention to the amount of carbohydrate they consume.
- Carbohydrate is the nutrient that breaks down into sugar (glucose) in our bodies as we digest it



# ARE CARBOHYDRATES BAD?

No!



- Individuals with diabetes must be mindful of how many carbs they eat, they don't need to avoid it altogether. Carbs are the body's main source of fuel and are necessary to maintain proper function.
- The type of carb and portion size are what matter most.

Think of your carb intake like **rain**:

- We don't want a drought or a flood but a nice even sprinkling throughout the day!

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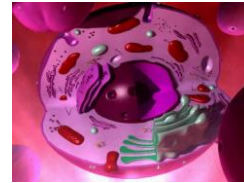
# WHAT IS GLUCOSE?

- Our bodies use carbohydrate for energy by turning it into glucose.

Glucose = energy

- Glucose provides energy for:

- Cells



- Brain



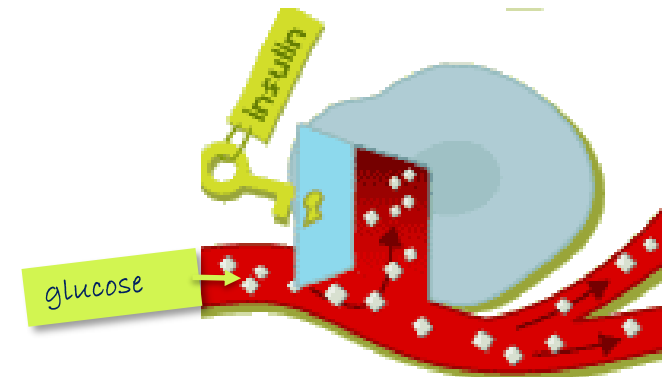
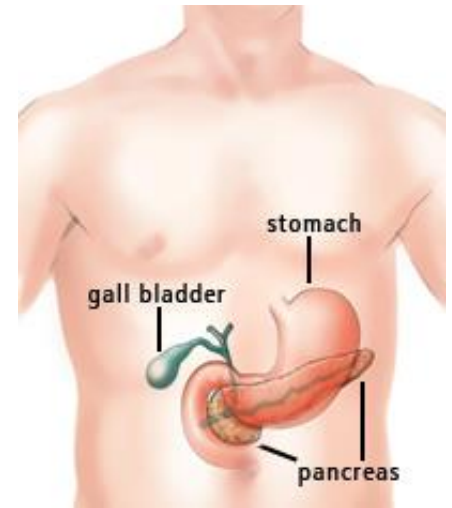
- Every function in the body!



# WHAT IS INSULIN?

**Insulin** = Hormone made by the pancreas

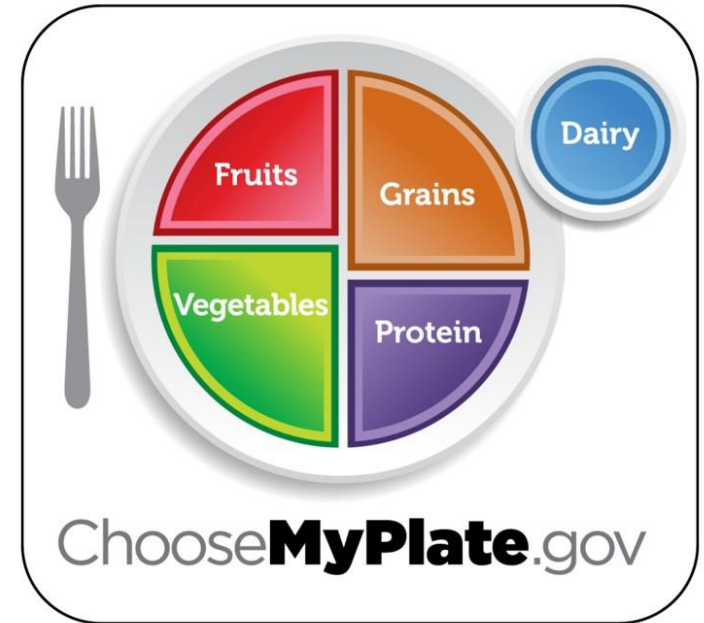
- In order to use energy from glucose, insulin must be available to carry glucose into the cells.
- Because people with diabetes have impaired insulin production, sugar can build up in their blood causing hyperglycemia.
- Our goal: matching carbohydrate intake to insulin needs!



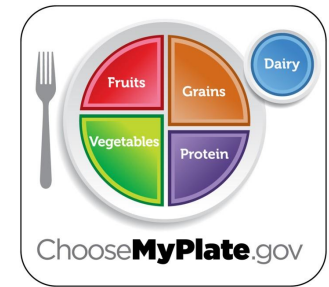


# HEALTHY EATING GUIDELINES

- Make  $\frac{1}{2}$  your plate **fruits and vegetables**
- Choose **whole grains**
- Choose **low-fat** or **fat-free** dairy
- Vary your proteins (think **lean!**)
- Eat and drink less **sodium**, **saturated fat**, and **added sugars**



# MACRONUTRIENTS



- **Carbohydrates:**
  - Grains
  - Beans, starchy vegetables
  - Fruit
  - Milk, yogurt
  - Dessert foods
- **Protein**
  - Beef, pork, poultry, fish
  - Eggs
  - Cheese
  - Nuts, tofu
- **Fat**
  - Butter, margarine
  - Oils, lard, salad dressings
  - Sour cream, mayonnaise

# TYPES OF CARBOHYDRATES

# STARCH



- Starch or amyllum is a polymeric carbohydrate consisting of numerous glucose units joined by glycosidic bonds called polymers. This polysaccharide is produced by most green plants as energy storage.
- Foods high in starch include:
  - Grains like wheat, oats, barley and rice
    - Crackers, tortillas, breads, pasta
  - Starchy vegetables:
    - Corn, green peas, potatoes, beets
  - Dried beans, lentils and peas
    - Pinto beans, kidney beans, black eyed peas and split peas

# SUGAR

- Naturally occurring sugars - milk (lactose) or fruit (fructose)
- Added sugars (sucrose)
  - Common names: table sugar, brown sugar, molasses, honey, beet sugar, cane sugar, confectioner's sugar, powdered sugar, raw sugar, turbinado, maple syrup, high-fructose corn syrup, agave nectar and sugar cane syrup.



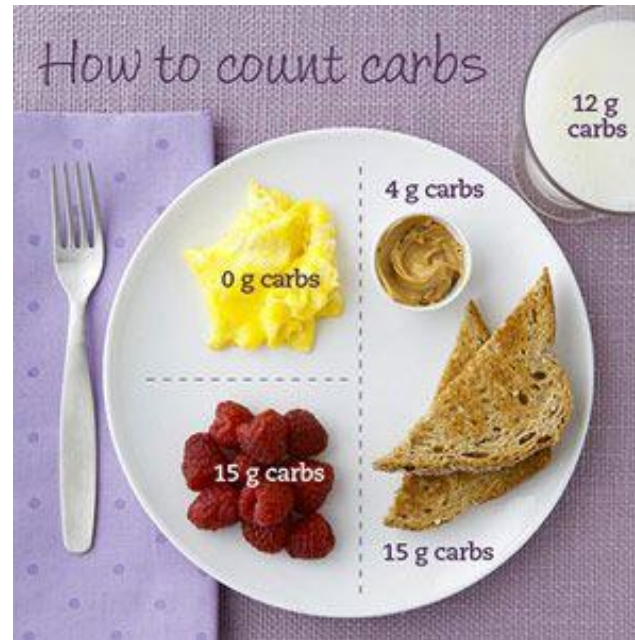
# FIBER

- Dietary fiber or roughage is the portion of plant-derived food that cannot be completely broken down by human digestive enzymes.
- Found in complex carbohydrates such as:
  - Fruits
  - Vegetables
  - Whole grains
  - Nuts
  - Legumes
- Beneficial for digestive health, management of cholesterol levels, and aids in satiety



# CARB COUNTING BASICS

- The portion size and carb count of all carb containing foods in a meal or snack must be evaluated and added up to provide total carbohydrates.



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# CARB COUNTING BASICS

- The average 2000 calorie diet may eat ~45-60g carbs per meal
- Carb consistent diets are usually used at first diagnosis
- Pts may then transition to insulin-to-carb ratio (ICR) for insulin injections or use with an insulin pump (ex. 1:10)



# CARB COUNTING APPLICATION

- Carb consistent diets are usually used at first diagnosis

	Breakfast	Morning Snack	Lunch	Afternoon Snack	Dinner	Bedtime Snack
Time of day	7:00am	10:00am	12:00pm	3:00pm	5:30pm	8:00pm
Grams of Total Carbohydrate	45 g	0-15 g	60 g	0-15 g	60 g	0-15 g

- Pts may then transition to insulin-to-carb ratio (ICR) for insulin injections or use with an insulin pump (ex. 1:10)

*A dietitian can help determine a carb prescription that is appropriate for the age and activity level of the child*

# SAMPLE CARB CONSISTENT DIETS

Girls/Ages (years)	Grams of Carbs	Calories (approx).	Breakfast	Snack	Lunch	Snack	Dinner	Snack
1-3	129	1000	30	8	30	8	45	8
4-5	166	1300	45	8	45	15	45	8
6-8	150	1300	45	0/15	45	0/15	45	0/15
9-11	180	1700	45	0/15	60	0/15	60	0/15
12-13	180	1700	45	0/15	60	0/15	60	0/15
14-16	195	1900	45	0/15	60	0/15	75	0/15
17-18	180	1700	45	0/15	60	0/15	60	0/15

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# UTILIZING THE CARB COUNT

1. Pt is prescribed a carb consistent diet or ICR
2. Pt calculates the amount of carbohydrate in their meal
3. Carb count is used to ensure compliance with carb consistent diet  
**OR** to determine amount of insulin needed with ICR  
**OR** is entered into an insulin pump which calculates insulin dose automatically.

# CARB COUNTING METHODS

1. Measuring portion sizes
2. Reading food labels
3. Utilizing websites and/or smart phone apps
4. “Guesstimating”



Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per 2/3 cup	<b>Calories 230</b>
% DV*	
12%	<b>Total Fat</b> 8g
5%	Saturated Fat 1g
	Trans Fat 0g
0%	<b>Cholesterol</b> 0mg
7%	<b>Sodium</b> 160mg
12%	<b>Total Carbs</b> 37g
14%	Dietary Fiber 4g
	Sugars 1g
	Added Sugars 0g
	<b>Protein</b> 3g
10%	Vitamin D 2mcg
20%	Calcium 260mg
45%	Iron 8mg
5%	Potassium 235mg
* Footnote on Daily Values (DV) and calories reference to be inserted here.	



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# CARB FOODS LIST

- Use as general guide to learn food groups and portion sizes
- Not always as accurate as food label
- Encourage students to refer to list when struggling to carb count
- Take a picture of the list and keep it in your phone for quick reference

## CARBOHYDRATE FOODS

These must be counted to maintain a consistent carbohydrate diet. All portions on this page have 15g carbohydrates. Check nutrition facts labels when possible.

### BREADS

- 1 individual
  - slice of regular bread
  - biscuit (2 ½ inch)
  - cornbread (1¼ inch)
  - pancake or waffle 4" across, ¼" thick
  - plain roll
  - 6" flour tortilla
  - 2 corn tortillas
- ½ individual
  - English muffin
  - bun
  - pita
- Others
  - ¼ large bagel
  - 2 taco shells
  - 1/3 cup stuffing
- 2 slices low calorie bread

### CEREALS & GRAINS

- 1/3 cup cooked (1 cup = 45g)
  - pasta
  - rice
  - couscous
  - quinoa
- ¼ cup (1 cup = 60g)
  - granola
- ½ cup (1 cup = 30g)
  - cooked grits
  - cooked wild rice
  - cooked oatmeal
- 3/4 cup (1 ½ cups = 30g)
  - cold breakfast cereal

### CRACKERS & SNACKS

- Crackers
  - 8 animal crackers
  - 6 Ritz® (round butter)
  - 6 saltines
  - 2-5 whole wheat
  - 3 graham squares
  - 20 oyster crackers
  - 55 Goldfish®
- Snacks
  - 3 cups popcorn
  - ¼ oz pretzels
  - 2 rice cake

### STARCHY VEGETABLES

- ½ cup cooked (1 cup = 30g)
  - corn
  - mashed potatoes
  - boiled potatoes
  - beans
  - lentils
  - peas
  - yams/sweet potatoes
- 1/3 cup (1 cup = 45g)
  - baked beans
  - hummus
- ¼ cup (1 cup = 60g)
  - mixed vegetables (corn, peas, lima beans)
  - edamame (shelled)
  - french fries
- Whole foods
  - ½ corn cob
  - ¼ large potato

### DAIRY

- 1 cup ANY milk
- ½ cup ice cream
- ½ cup pudding
- 2/3 cup yogurt

### DRINKS

- 4 oz (1/2 cup)
  - regular juice
  - regular soda/pop
- 8 oz (1 cup)
  - Gatorade® "G series"
  - Powerade®
  - VitaminWater™ (formula50)
- 24 oz Gatorade® "G2"

### FRUIT

- Whole fruit (Tennis ball size)
  - 1 small apple
  - 1 medium orange
  - 1 kiwi
  - 1 small nectarine
  - 1 medium peach
  - ½ medium banana
  - 1 cup melon cubes
  - 1¼ cup whole strawberries
  - ¾ cup berries
  - 12 fresh cherries
  - 17 small grapes
  - ½ small or ¼ cup mango
  - ½ fruit or 1 cup cubes papaya
  - ½ medium pear
  - ¾ cup fresh pineapple
  - 2 small plums
  - 2 small tangerines/clementines
- Canned fruit (No sugar added):
  - ½ cup any canned fruit
  - ¼ cup applesauce
  - ¼ cup canned mandarins
- 2 Tbsp dried fruit

### CONDIMENTS

- 1 Tablespoon (3 teaspoons)
  - honey or agave
  - sugar
  - jelly/ jam
  - syrup
  - BBQ sauce
  - ketchup
  - sweet salad dressing



# NON-CARB FOODS LIST

- AKA “free foods”
- Fill up on non-starchy vegetables and lean proteins
- Choose healthy unsaturated fats

## NON-CARBOHYDRATE FOODS

These foods do not raise blood glucose levels significantly.

### NON-STARCHY VEGETABLES

1 cup raw or ½ cup cooked =  
~ 5 grams of carbohydrate

- artichoke
- asparagus
- bamboo shoots
- beans (green, Italian)
- beets
- broccoli
- brussels sprouts
- cabbage
- carrots
- cauliflower
- celery
- coleslaw, no dressing
- cucumber
- eggplant
- greens (collard, kale, turnip)
- leeks
- mushrooms
- okra
- onions
- pea pods or pea snaps
- peppers
- radishes
- salad greens
- sauerkraut
- soybean sprouts
- spinach
- squash (summer, zucchini)
- tomatoes
- turnips
- water chestnuts

### OTHER

- Non-nutritive sweeteners
  - Splenda® (sucralose)
  - Equal® (aspartame)
  - Truvia® (stevia)
  - Sweet N' Low® (saccharin)
- Sugar free:
  - Jello/ gelatin
  - Popsicle
  - Cool Whip®

### PROTEINS

#### (Meat & Meat Substitutes)

*Prepare meats without  
batter/breading\**

#### Meats

- beef
- chicken
- fish
- pork
- shellfish
- wild game
- processed sandwich meats

#### Meat Substitutes

- beef jerky
- cheese
- cottage cheese
- egg substitutes
- egg whites
- whole egg
- hot dog

#### Plant- Based Proteins

- Nut spreads  
(almond, peanut butter,  
or soy)

*\*Batter/breading contains  
carbohydrates*

### FATS

*Fats will help slow the rise of blood  
glucose after meals. These should be  
used sparingly.*

- ✓ choose low-fat versions of all fats  
when possible.
- ✓ fat should represent 30% or less of  
daily intake.

#### Unsaturated Fats Monounsaturated

- avocado
- nuts
- olive, canola or peanut oil
- black olives
- green olives

#### Unsaturated Fats Polyunsaturated

- low fat margarine,  
reduced fat mayo or salad  
dressing
- stick or tub margarine,  
regular mayo or salad dressing,
- oil: corn, cottonseed, flaxseed,  
grapeseed, safflower, sunflower, enova  
soybean
- walnuts halves

#### Saturated Fats

- stick butter, lard,  
Shortening
- coconut, palm
- reduced fat butter,  
heavy cream, regular cream  
cheese
- light cream,  
reduced fat cream cheese
- regular sour cream  
and coconut
- bacon
- light sour cream



# READING FOOD LABELS

## Servings per Container

It is important to know how many servings are in the package as a whole. If you eat all 8 servings in this container, you will need to multiply all nutrition values by 8.

## Serving Size

Start with the serving size. All of the nutrition values listed on the label are for that one serving size.

## Nutrition Facts

8 servings per container  
**Serving size 2/3 cup (55g)**

Amount per serving  
**Calories 230**

% Daily Value\*

**Total Fat** 8g **10%**

Saturated Fat 1g **5%**

Trans Fat 0g

**Cholesterol** 0mg **0%**

**Sodium** 160mg **7%**

**Total Carbohydrate** 37g **14%**

Dietary Fiber 4g **14%**

Total Sugars 12g

Includes 10g Added Sugars **20%**

**Protein** 3g

Vitamin D 2mcg **10%**

Calcium 260mg **20%**

Iron 8mg **45%**

Potassium 240mg **6%**

\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

## \* Serving Size grams

This is the product weight in grams and not grams of carbohydrates. This is helpful if you have a food scale.

## Total Carbohydrates

To count carbohydrates, look at the grams of total carbohydrates. Dietary fiber and total sugars are included in total carbohydrate amount.

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- How many servings in this product?

8 servings

- What is the serving size of this product?

2/3 cup

- How many grams of carbohydrates in this product?

37g

- How many grams would be in 2 servings of this product?

74g

Nutrition Facts	
8 servings per container	
<b>Serving size</b>	<b>2/3 cup (55g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>230</b>
% Daily Value*	
<b>Total Fat</b> 8g	<b>10%</b>
Saturated Fat 1g	<b>5%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 160mg	<b>7%</b>
<b>Total Carbohydrate</b> 37g	<b>13%</b>
Dietary Fiber 4g	<b>14%</b>
Total Sugars 12g	
Includes 10g Added Sugars	<b>20%</b>
<b>Protein</b> 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%
* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	



# USEFUL TOOLS

- Apps

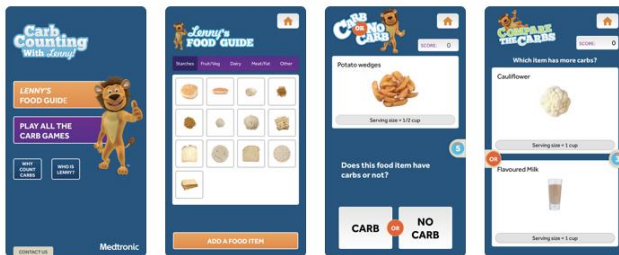
- My Fitness Pal



- Calorie King



- Carb Counting with Lenny



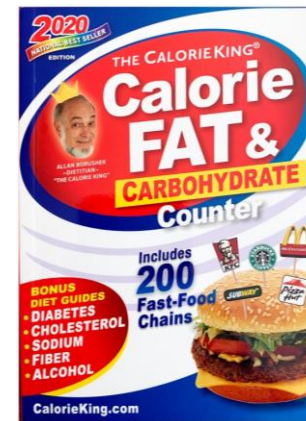
- Websites

- <https://www.myfitnesspal.com>

- <http://www.lillydiabetes.com>

- Book

- Calorie King 2020!



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# TREAT, SWEETS & SNACKS

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# CARB COUNTING FOR TREATS AND SWEETS

- Mini cupcake (15g CHO) vs regular (35-40g)



- Lofthouse cookie (~25g) vs mini Lofthouse cookie (~10g)






















- Small slice of birthday cake (~40g)



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## 15g CARBOHYDRATE SNACKS

 <p>1 small apple</p>	 <p>Half of a banana</p>	 <p>½ mango</p>	 <p>1 cup watermelon</p>	 <p>1 medium orange</p>	 <p>12 fresh cherries</p>
 <p>15 medium Strawberries or 1 ¼ cup</p>	 <p>2 small plums, clementines, apricots</p>	 <p>1 small bunch (~17 grapes)</p>	 <p>¼ cup raisins or small matchbox size</p>	 <p>½ cup unsweetened applesauce</p>	 <p>½ cup canned fruit in juice (not syrup)</p>
 <p>1 slice toast</p>	 <p>100 Calorie Snack Pack - Cookie</p>	 <p>½ cup ice cream (not including cone)</p>	 <p>8 oz white milk</p>	 <p>½ cup sugar free pudding</p>	 <p>4 oz yogurt (Check Label)</p>
 <p>100 Calorie Snack Pack - Cracker</p>	 <p>8 animal crackers</p>	 <p>1 oz bag chips</p>	 <p>15-20 pretzels</p>	 <p>15-20 Cheez-Itz®</p>	 <p>1 granola bar (Check Label)</p>

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## HEALTHY COMBINATION SNACK IDEAS

Great snacks include 15g carbohydrate + protein



8 animal crackers &  
2 tablespoons peanut butter



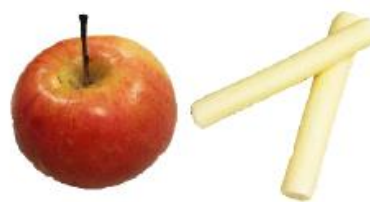
1 slice toast & 2 tablespoons peanut butter



3 cups plain popcorn &  
1 oz nuts



15-20 Cheese-Itz® crackers &  
1 oz cheese



1 small fruit &  
1 oz cheese



1 ounce mini muffin &  
 $\frac{1}{4}$  cup cottage cheese



$\frac{1}{2}$  sandwich (meat, cheese, vegetables or  
peanut butter with no jelly)



6 saltine crackers &  
 $\frac{1}{4}$  cup tuna salad











15-20 baked tortilla chips &  
2 tablespoons hummus

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## LOW OR NO CARBOHYDRATE SNACKS

					
carrots	celery	cherry tomatos	lettuce	spinach	cauliflower
					
bell pepper	pickles	cucumber	zucchini	avocado	broccoli
					
string cheese	cheese cubes	cottage cheese	eggs	sliced turkey, chicken, ham, roast beef	tuna
					
nuts	peanut butter	pepperoni slices	beef jerky	sugar-free jello	sugar-free popsicles

## HEALTHY COMBINATION LOW OR NO CARBOHYDRATE SNACK IDEAS

 <p>turkey and cheese roll ups</p>	 <p>side salad with egg or avocado</p>	 <p>carrots and ranch dressing</p>
 <p>celery and peanut butter</p>	 <p>cucumber slices and tuna</p>	 <p>pepperoni slices and cream cheese</p>
 <p>tomato and mozzarella</p>	 <p>lettuce wrap with chicken or tuna salad</p>	 <p>bell pepper and hummus</p>



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**COMMENTS/QUESTIONS?**