Glycemic Index and Glycemic Load

What is the Glycemic Index?

The Glycemic Index (GI) is a tool to measure how individual foods are expected to impact blood sugar levels.

What does the number mean?

The number is a comparison between individual foods and a sugar called glucose. Glucose is given a value of 100. If the test food is assigned a value below 100, that food is expected to impact your blood sugar less than glucose. If the test food is assigned a value over 100, that food is expected impact your blood sugar more than glucose.

Who may be interested in the Glycemic Index?

- People who have diabetes and blood sugar related health issues may use GI values as a guideline and an additional tool for managing blood sugar levels.
- GI values can also be used when treating reactive hypoglycemia (reactive low blood sugar).
- Studies have shown that when eating low GI foods, people tend to snack less, *which may be helpful* in weight control as well as blood sugar control. It may lead to eating fewer calories and improved average blood sugar.

What are the limitations of using the Glycemic Index?

- Glycemic Index values were determined in studies where volunteers ate portions containing 50 grams of carbohydrate of each test food. However, 50 grams of carbohydrate isn't necessarily a usual portion size. For example, 50 grams of carbohydrate from popcorn is ten cups popped, while 50 grams of carbohydrate from white rice is about one cup cooked.
- There is a wide variation in values assigned to the same food. One source may say a russet potato has a GI of 56 and another source may say the GI is 111.
- *GI values can vary* depending on the ripeness of the food, the degree of processing, and the cooking method.
- *Glycemic Index values measured the effect of a test food when that food was eaten alone.* Most meals contain a variety of foods in combination. The glycemic effect of a food changes when it is combined with other foods. For example, fat delays digestion, and fiber helps buffer the impact of carbohydrates eaten.
- The effect of food on blood sugar can vary from person to person. Blood sugar levels are also affected by activity levels, exercise, hormones, stress, sleep issues and medications.

- A lower GI value does not necessarily mean the food is a better choice. For example, a chocolate candy bar and 1 cup of brown rice may both have a GI of 55, but the overall nutritional value is very different**.** In this example, the brown rice is far more nutritious.

What is the Glycemic Load?

The Glycemic Load (GL) is an equation that takes into account the planned *portion size* of a food as well as the glycemic index of that food. **Glycemic Load = GI/100 multiplied by the net grams of planned carbohydrate** (net carbohydrate is the total grams of carbohydrate minus the dietary fiber). In theory, a large amount of a low GI food may increase your blood sugar as much as a small amount of a high GI food.

Key	**Low**	**Medium**	**Large**
Glycemic Index	55 or less	56 - 69	70 or higher
Glycemic Load	10 or less	11 - 19	120 or higher

Tips for using the Glycemic Index and Glycemic Load:

- Eat more vegetables and fruits. Emphasize eating green leafy vegetables. When eating fruit, eat it in its natural state. Avoid eating fruit with the skin off and drowning in sugary syrup of any kind. For example, eat an apple with the skin on, not applesauce with added sugar.
- Choose higher fiber foods and more whole grains. Be mindful of portion size for grains.
- Keep in mind, liquids digest quickly and raise blood sugar levels faster than solids. For example, sugar sweetened beverages and even natural fruit juices can rapidly raise blood sugar levels. Read labels so you know the carbohydrate content for the serving sizs.
- Limit high fat, lower GI foods (like chocolate bars) that aren't really nutritious.

FOOD	Glycemic index (glucose = 100)	Serving size (grams)	Glycemic load per serving
BAKERY PRODUCTS AND BREADS			
Banana cake, made with sugar	47	60	14
Banana cake, made without sugar	55	60	12
Sponge cake, plain	46	63	17
Vanilla cake made from packet mix with vanilla frosting (Betty Crocker)	42	111	24
Apple, made with sugar	44	60	13
Apple, made without sugar	48	60	9
Waffles, Aunt Jemima (Quaker Oats)	76	35	10
Bagel, white, frozen	72	70	25
Baguette, white, plain	95	30	15
Coarse barley bread, 75-80% kernels, average	34	30	7
Hamburger bun	61	30	9
Kaiser roll	73	30	12
Pumpernickel bread	56	30	7
50% cracked wheat kernel bread	58	30	12
White wheat flour bread	71	30	10

Wonder™ bread, average	73	30	10
Whole wheat bread, average	71	30	9
100% Whole Grain™ bread (Natural Ovens)	51	30	7
Pita bread, white	68	30	10
Corn tortilla	52	50	12
Wheat tortilla	30	50	8
BEVERAGES			
Coca Cola®, average	63	250 mL	16
Fanta®, orange soft drink	68	250 mL	23
Lucozade®, original (sparkling glucose drink)	95±10	250 mL	40
Apple juice, unsweetened, average	44	250 mL	30
Cranberry juice cocktail (Ocean Spray®)	68	250 mL	24
Gatorade	78	250 mL	12
Orange juice, unsweetened	50	250 mL	12
Tomato juice, canned	38	250 mL	4

FOOD	Glycemic index (glucose = 100)	Serving size (grams)	Glycemic load per serving
BREAKFAST CEREALS AND RELATED PRODUCTS			
All-Bran™, average	55	30	12
Coco Pops™, average	77	30	20
Cornflakes™, average	93	30	23
Cream of Wheat™ (Nabisco)	66	250	17
Cream of Wheat™, Instant (Nabisco)	74	250	22
Grapenuts™, average	75	30	16
Muesli, average	66	30	16
Oatmeal, average	55	250	13
Instant oatmeal, average	83	250	30
Puffed wheat, average	80	30	17
Raisin Bran™ (Kellogg's)	61	30	12
Special K™ (Kellogg's)	69	30	14
GRAINS			
Pearled barley, average	28	150	12
Sweet corn on the cob, average	60	150	20
Couscous, average	65	150	9
Quinoa	53	150	13
White rice, average	89	150	43
Quick cooking white basmati	67	150	28
Brown rice, average	50	150	16

Converted, white rice (Uncle Ben's®)	38	150	14
Whole wheat kernels, average	30	50	11
Bulgur, average	48	150	12
COOKIES AND CRACKERS			
Graham crackers	74	25	14
Vanilla wafers	77	25	14
Shortbread	64	25	10
Rice cakes, average	82	25	17
Rye crisps, average	64	25	11
Soda crackers	74	25	12
DAIRY PRODUCTS AND ALTERNATIVES			
Ice cream, regular	57	50	6
Ice cream, premium	38	50	3
Milk, full fat	41	250mL	5
Milk, skim	32	250 mL	4
Reduced-fat yogurt with fruit, average	33	200	11

FOOD	Glycemic index (glucose = 100)	Serving size (grams)	Glycemic load per serving
FRUITS			
Apple, average	39	120	6
Banana, ripe	62	120	16
Dates, dried	42	60	18
Grapefruit	25	120	3
Grapes, average	59	120	11
Orange, average	40	120	4
Peach, average	42	120	5
Peach, canned in light syrup	40	120	5
Pear, average	38	120	4
Pear, canned in pear juice	43	120	5
Prunes, pitted	29	60	10
Raisins	64	60	28
Watermelon	72	120	4
BEANS AND NUTS			
Baked beans, average	40	150	6
Blackeye peas, average	33	150	10
Black beans	30	150	7
Chickpeas (garbanzo beans), average	10	150	3
Chickpeas, canned in brine	38	150	9
Navy beans, average	31	150	9
Kidney beans, average	29	150	7

Lentils, average	29	150	5
Soy beans, average	15	150	1
Cashews, salted	27	50	3
Peanuts, average	7	50	0
PASTA and NOODLES			
Fettuccini, average	32	180	15
Macaroni, average	47	180	23
Macaroni and Cheese (Kraft)	64	180	32
Spaghetti, white, boiled, average	46	180	22
Spaghetti, white, boiled 20 min, average	58	180	26
Spaghetti, wholemeal, boiled, average	42	180	17

FOOD	Glycemic index (glucose = 100)	Serving size (grams)	Glycemic load per serving
SNACK FOODS			
Corn chips, plain, salted, average	42	50	11
Fruit Roll-Ups®	99	30	24
M & M's®, peanut	33	30	6
Microwave popcorn, plain, average	55	20	6
Potato chips, average	51	50	12
Pretzels, oven-baked	83	30	16
Snickers Bar®	51	60	18
VEGETABLES			
Green peas, average	51	80	4
Carrots, average	35	80	2
Parsnips	52	80	4
Baked russet potato, average	111	150	33
Boiled white potato, average	82	150	21
Instant mashed potato, average	87	150	17
Sweet potato, average	70	150	22
Yam, average	54	150	20
MISCELLANEOUS			
Hummus (chickpea salad dip)	6	30	0
Chicken nuggets, frozen, reheated in microwave oven	46	100	7

5 min			
Pizza, plain baked dough, served with parmesan cheese and tomato sauce	80	100	22
Pizza, Super Supreme (Pizza Hut)	36	100	9
Honey, average	61	25	12

The complete list of the glycemic index and glycemic load for more than 1,000 foods can be found in the article "International tables of glycemic index and glycemic load values: 2008" by Fiona S. Atkinson, Kaye Foster-Powell, and Jennie C. Brand-Miller in the December 2008 issue of Diabetes Care, Vol. 31, number 12, pages 2281-2283. Diabetes Care. 2008 Dec; 31(12): 2281–2283. doi: 10.2337/dc08-1239
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2584181/
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