

Lesson 9: Diabetes

Glossary

1. **Carbohydrates:** nutrients that give your body energy to use immediately (found in sugars, starches, and fibers in food like bread, rice, pasta, fruits, vegetables, etc.)
2. **Diabetes:** a chronic disease where the body cannot produce enough insulin (type 1) or the body cannot use insulin well (type 2)
 - a. **Type 1 Diabetes:** type of diabetes where the pancreas does not produce insulin
 - b. **Type 2 Diabetes:** type of diabetes where the body cannot use insulin correctly
3. **Diet:** the foods a person eats
4. **Gestational Diabetes:** a type of diabetes you can get when pregnant that usually goes away after the baby is born; women who have had gestational diabetes while pregnant are more likely to develop type 2 diabetes after they are pregnant
5. **Glucose:** a type of sugar found in some foods that provides energy
6. **Hormones:** chemicals that travel through the body and send signals to cells, telling them how to work
7. **Insulin:** a hormone that controls sugar levels in the body by moving sugar into cells so the body can make energy
8. **Pancreas:** an organ near the stomach that makes insulin and pumps it into the body
9. **Pre-diabetes:** a person has a higher blood sugar level than normal, but not high enough to be diagnosed with diabetes; people with pre-diabetes may develop diabetes
10. **Stroke:** when blood flow to the brain is blocked or when there is bleeding in the brain

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Group 1 Jigsaw Reading

Background Information

Carbohydrates & Glucose

Like a car needs fuel to run, our bodies need food for energy.

Carbohydrates are sugars, starches, and fiber in foods.

When you eat, your body breaks down carbohydrates into simple sugars (the main one is **glucose**), which give your body the energy it needs. Most of the energy that comes from food is from carbohydrates.

Here are some examples of foods with a lot of carbohydrates:

- Tortillas, rice, bread, bagels, pasta
- Starchy vegetables like corn, peas, potatoes, and sweet potatoes
- Fruit and fruit juices
- Milk, yogurt, ice cream
- Desserts like cakes, cookies, candy, and pastries
- Potato chips, pretzels, popcorn
- Soda pop, sweet tea, sweet coffee

Some foods that are high in carbohydrates are **healthy** (vegetables, fruits, and whole-grain bread, for example). Other high-carbohydrate foods are not as healthy, like soda and sweets.

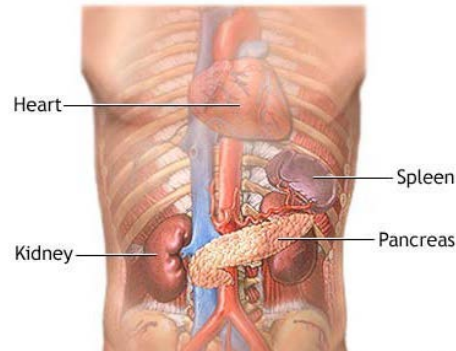
Hormones & Insulin

Insulin is a hormone. A **hormone** is a chemical in your body that **sends** signals to cells to do things. Insulin is made by the **pancreas**, an organ near your stomach. When the amount of sugar (glucose) in the blood goes up, the pancreas makes insulin. Insulin's job is to move glucose from the blood into the cells, where it is used for energy.

Your digestive system breaks down the carbohydrates in the foods you eat. The simple sugars, mainly glucose, move into your blood stream. Next, insulin helps move the glucose from the blood into your body's cells to use as **immediate energy** or store for later use.

Cells need glucose to fuel the body. Insulin is important because it moves glucose into cells. Without insulin, glucose stays in the blood instead of getting used by the cells, and this causes big problems for the body.

When you have **diabetes** or **pre-diabetes**, insulin does not work as it should, so your cells do not get the energy they need, and glucose builds up in your blood. High blood glucose can harm almost every part of your body.



Diabetes

There are different types of diabetes. With diabetes, your body does not make enough insulin, or the insulin does not work as it should to help your body get energy from the food you eat.

Having diabetes can increase your risk for other health concerns, like arthritis, hearing loss, blindness, depression, and **stroke**.

Type 1 diabetes is a serious auto-immune disease where the pancreas stops making insulin. People with type 1 diabetes need to take insulin shots every day and could die if they do not get this treatment. Type 1 diabetes is usually diagnosed during childhood.

Type 2 diabetes is more common than type 1. Type 2 diabetes is caused when blood sugar is high for a long time, which is related to lifestyle (**diet**, exercise, etc.). Type 2 diabetes is often diagnosed in adults, but children may have it, too. Even if type 2 diabetes does not cause symptoms at first, it can cause many serious health problems over time. Unlike type 1 diabetes, type 2 may be prevented by keeping a healthy weight, exercising, and eating a healthy diet.

Gestational diabetes can happen to women during their pregnancy, and it usually goes away after the baby is born. Gestational diabetes can harm both the mom and baby if it is not treated by a doctor, so treatment is important. A woman who has had gestational diabetes is also at higher risk of getting Type 2 diabetes.

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Group 2 Jigsaw Reading

Why is it important to know about diabetes?

Diabetes can cause life-threatening health problems or early death. Having diabetes means more doctor visits, tests, medicines, hospital visits, medical supplies, and expenses. Diabetes may also cause you to miss work and miss doing things you enjoy because of health problems.

Diabetes can affect anyone at any age, but some people are more at risk than others. Type 1 diabetes cannot be prevented, but there are steps you can take to prevent type 2 diabetes.

Diabetes cannot be cured, but it can be treated, so you can live a long, healthy life. Your doctor can give you medication, but it is up to you to take care of yourself every day and control your diabetes for life.

Complications of Diabetes

Heart disease

- Having diabetes increases blood pressure and cholesterol
- Increased blood pressure and cholesterol can lead to heart disease
- Heart disease increases chances of stroke and heart attacks

Arthritis

- Joint problems that can cause pain and limited movement

Nerve and blood vessel problems

- A person with diabetes might have numbness, a tingling feeling, or pain in the hands and feet
- Diabetes can damage vessels and make it hard for blood to flow where it needs to go. If parts of the body, like the feet, do not get enough blood, they may become damaged. In severe cases, toes, feet, or even legs may have to be amputated (cut off by a surgeon)

Eye problems

- Cataracts: blurred vision
- Diabetic retinopathy: blood vessels in the eyes leak, which can cause blindness

Stroke

- Also called a “brain attack,” a stroke happens when blood flow to the brain is blocked, or when there is bleeding in the brain.
- Strokes can cause permanent brain damage and death.

Kidney disease

- The kidneys remove waste from your blood.
- Having untreated diabetes makes the kidneys work too hard. Over time, the kidneys stop working (kidney failure).
- Kidney failure may require treatment like kidney dialysis (medical treatment to filter the body's waste when a failing kidney is no longer able to do so), and it can be deadly. Diabetes can also cause **hearing loss, dental problems, and digestion problems**. It can also contribute to mental health conditions like **depression**.

Risk Factors for Diabetes¹

Type 1 Diabetes

- Family history: having a parent, sister, or brother with diabetes
- Age: Type 1 diabetes can develop at any age, but it is most commonly diagnosed in children, teens, and young adults

Pre-Diabetes and Type 2 Diabetes

- Overweight: this is the main risk factor for type 2 diabetes; most people with type 2 diabetes are overweight
- Age: your risk for type 2 diabetes increases with age
 - Start getting tested every year if you are age 45 or older
 - Get tested at a younger age if you have other risk factors
- Inactivity: you are at higher risk if you do little or no exercise
- Gestational diabetes: you are at greater risk for type 2 diabetes if you have had gestational diabetes during pregnancy
- You are also at higher risk if you are African American, Hispanic/Latino, or American/Alaska Native. Some Asian groups are also at higher risk.

Ask your doctor if you are at risk for diabetes. There are many things you can do to lower your risk. The test for diabetes is a blood test and is done in the clinic.

¹ <https://www.cdc.gov/diabetes/risk-factors/index.html>

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Group 3 Jigsaw Reading

Preventing Diabetes

Taking these steps can help you prevent Type 2 diabetes, even if you have pre-diabetes (blood sugar higher than normal).

- **Exercise:** Try to get at least 30 minutes of moderate physical activity, such as walking, most days, to **elevate your heart rate**
- **Eat healthy foods:** Eating healthy foods can help to prevent unhealthy weight gain, which increases your risk of developing diabetes. Eat more fruits, vegetables and whole grains and less sugar and fat.
- **Maintain a healthy weight:** If you are overweight, eat healthier foods like fruits and vegetables. Losing just 10 pounds can make a difference!
- **Stop smoking**
- **Get regular check-ups with your doctor and dentist**

Diagnosing Diabetes

Many people with diabetes have no symptoms. You might have diabetes but not know it. Even if it does not cause symptoms at first, diabetes can lead to many serious health problems. It is important to see your healthcare provider regularly, to check for illnesses such as diabetes.

Living with Diabetes

What lifestyle changes might someone with diabetes need to make?

Monitor your blood glucose levels

- Get an A1C test at your clinic at least once a year. This test shows what your **average blood glucose level** has been over the last three months.
- Use a blood glucose meter to test your blood sugar at that moment. You may need to do this more than once a day.

Watch what you eat

Most people with diabetes have to keep track of how many carbohydrates they are eating each day. They need to know what to eat, when to eat and how much to eat. A diabetic educator or nutritionist can help guide you in determining a healthy diet for you.

Take your medications (they work – but only if you take them!)

- Some people can manage their diabetes by exercising and eating the right foods, without needing medicines.
- Most people have to take medications to treat their diabetes. These may be pills, shots or a combination of these.
- Insulin is taken as a shot into the skin using a very small needle that does not hurt.

Stop smoking

Smoking keeps insulin from working as it should.

Control blood pressure and cholesterol

- Diabetes can cause your blood pressure and cholesterol to rise, putting you at risk for heart disease, heart attack and stroke.
- Get your blood pressure tested often and your cholesterol level tested every year. Your doctor may advise you monitor your blood pressure at home, or come to the clinic occasionally

Regular checkups

- At least **every 6 months**, see your doctor, visit your dentist, and get a diabetic eye exam to prevent complications. Your health care team may want you to visit more often if needed.
- Work with your health care team (such as your doctor, nurse, diabetes educator, dietitian, pharmacist and community health worker) to set goals for controlling your diabetes.
- Ask your health care team if you have questions or do not know what to do.

Exercise

- Exercise helps insulin work better, helps keep you at a healthy weight, improves your mood and helps you sleep.
- Ask your doctor which exercises are right for you.

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Jigsaw Questions

Answer the questions with your group. Then form a new group with one student from each original group. Each student will answer the questions for their group members.

Student 1 – Background Information

1. Name 4 examples of carbohydrates. _____

2. Why is insulin important? _____
3. What is type 1 diabetes? _____
4. How might type 2 diabetes be prevented?

Student 2 – Complications of Diabetes

5. Why is it important to know about diabetes?

6. Name 4 major complications from diabetes. _____

7. What are some risk factors of diabetes? _____

8. When should you get tested for diabetes? _____

Student 3 – Preventing and Living with Diabetes

9. How can you prevent diabetes? _____

10. What lifestyle changes does someone living with diabetes need to make? _____

11. Why is it important to eat healthy foods? _____

12. How is exercise important in helping to prevent diabetes? _____

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Vocabulary Match and Complete the Sentence

About the body

Read each item. Write the letter from the column on the right that gives the correct definition of the term on the left. Use the Background Information reading to help you.

1. _____ hormone

2. _____ gestational diabetes

3. _____ Type 2 Diabetes

4. _____ glucose

5. _____ insulin

6. _____ pancreas

7. _____ carbohydrates

8. _____ Type 1 Diabetes
- a. A chronic condition in which the pancreas produces little to no insulin

b. When the body becomes resistant to insulin

c. Diabetes some women get while pregnant

d. An organ near the stomach that pumps insulin into the body

e. A chemical that regulates body function

f. Sugars needed for energy

g. A hormone that moves glucose into cells to use or store as energy

h. A type of sugar found in fruit and other plants; it provides energy

Use the words in the box to complete each sentence in the following passage.

insulin	glucose	pancreas	hormone	diabetes	carbohydrates
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The body gets energy from _____ found in food. After you eat, the body breaks down carbohydrates into _____ (a type of sugar). Cells need glucose to fuel the body. _____ is important because it is the _____ that moves glucose into cells. Insulin is made in the _____. Without insulin, glucose builds up in the blood instead of getting used by the cells, and this causes big problems for the body, such as _____.

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Question and Answer Match

What is a glucose meter?	What is a carbohydrate?		
What is a diabetes risk factor?	What are complications of diabetes?		
What are symptoms of diabetes?	How can you prevent diabetes?		<ul style="list-style-type: none">• Frequent Urination• Unusual Thirst• Blurred Vision• Numb, tingling or swollen feet
What food has glucose?		<ul style="list-style-type: none">• Heart Disease• Arthritis• Kidney Disease• Stroke	

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Complete the Sentence and Critical Thinking

Risk Factors

Use the words in the box to complete each sentence in the following passage.

exercise	age	overweight	smoking	gestational	pressure
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Many people with diabetes are _____. Your risk of getting Type 2 diabetes increases with _____. Another risk factor is high blood _____. Getting little or no physical activity or _____ will also increase your risk of getting diabetes. _____ is an activity that increases your risk of diabetes. If you had _____ diabetes during pregnancy, that could put you at greater risk for diabetes.

Diabetes Prevention

Critical thinking skills:

- 1. Think about the question.
- 2. Talk about the answer with a partner.
- 3. Write a brief paragraph to answer the question.

What can you do to prevent diabetes?

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True or False and Writing

Diabetes

Read each sentence. Then circle T if the sentence is a true statement or F if the sentence is a false statement. Use the readings about diabetes to help you.

1. High blood glucose can harm almost every part of your body.	T	F
2. Diabetes can be treated.	T	F
3. Diabetes is inexpensive.	T	F
4. If untreated, diabetes can cause life-threatening problems.	T	F
5. Heart disease is a complication of diabetes.	T	F
6. Diabetes only affects the elderly.	T	F
7. Kidney disease and stroke are the only complications of diabetes.	T	F
8. Diabetes cannot be cured.	T	F

Lifestyle Changes

Write some advice to someone who has diabetes. Use the word “*should*” in each sentence. What lifestyle changes “*should*” the person make?

1. You **should** watch your blood glucose levels.
2. _____
3. _____
4. _____
5. _____
6. _____

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Quiz

Read the questions. Then circle A, B, C or D.

- | | |
|---|--|
| <p>1. What are some possible complications of diabetes?</p> <p>A. Depression
B. Eye problems
C. Heart disease
D. All of the above</p> <p>2. Which of the following are risk factors for diabetes?</p> <p>A. Being overweight
B. Being a smoker
C. Having a family history of diabetes
D. All of the above</p> <p>3. Diabetes is NOT:</p> <p>A. Treatable
B. Curable
C. Expensive
D. Life-Threatening</p> <p>4. How can you prevent diabetes?</p> <p>A. Eat healthy foods
B. Continue smoking
C. Get more exercise
D. Both A and C</p> | <p>5. Which type of diabetes starts during pregnancy and usually goes away after the baby is born?</p> <p>A. Type 1
B. Type 2
C. Gestational
D. None of the above</p> <p>6. When should you get tested for diabetes?</p> <p>A. Every year once you reach 45
B. Every year once you reach 40
C. Every year once you reach 54
D. Every year once you reach 50</p> <p>7. Which are NOT examples of foods with a lot of carbohydrates?</p> <p>A. Bread, bagels and pasta
B. Soda pop, sweet tea and juice
C. Green leafy vegetables
D. Cookies, candy and ice cream</p> <p>8. What does insulin do?</p> <p>A. Finds glucose in the bloodstream
B. Helps turn carbohydrates into energy
C. Transports glucose to cells
D. All of the above</p> <p>9. How can you learn more about diabetes?</p> <p>_____</p> <p>_____</p> |
|---|--|

Student Survey: Diabetes Unit

1. Did you learn more information about diabetes from studying this lesson?

1	2	3	4	5
no		some		yes

2. Would you share this information with family and friends?

1	2	3	4	5
no		maybe		yes

3. After studying this lesson, are you more likely to ask your health care provider about diabetes?

1	2	3	4	5
no		somewhat		yes

4. Do you know where to find more information about diabetes if you have more questions?

1	2	3	4	5
no		somewhat		yes

5. Did you like the class activities?

1	2	3	4	5
no		somewhat		yes

We value your opinions! Could you tell us what you liked or give us some suggestions on how to improve this lesson?

Thank you!