

# Blood Glucose

## Teacher Presentation Slides

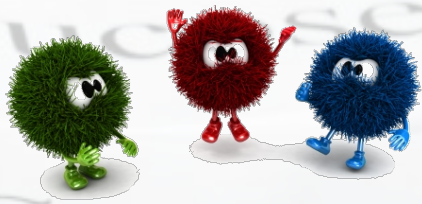
### Learning Objective 4

Te Maki Toto Vene (T2): E Manamanata no Toku Iti Tangata

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# Carbohydrates: An Energy Source

SLR 8

1

## Read the SLR 8 sheet on Carbohydrates: An Energy Source

Student Learning Resource

**SLR 8** Carbohydrates: An energy source 1 of 2

### Carbohydrates

Carbohydrates are the most common foods in our diet. They can be divided into two groups - complex carbohydrates and simple carbohydrates. During digestion, most carbohydrates can be broken down into simple sugars (mainly glucose), to provide energy for our cells.

Complex carbohydrates such as starch and cellulose are made up of long-chains of glucose molecules. They are found in whole-grain foods, vegetables and fruit.

Cellulose is an important component in the cell walls of plants. It cannot be digested by humans however foods rich in cellulose provide fibre, an essential component in a healthy diet.

Starch is found in foods such as cereals or grains (e.g. oats, wheat, rice, maize, barley), pasta, green vegetables, fruits and root vegetables. Starch forms the largest component of the diet of most humans.

Foods rich in complex carbohydrates are digested slowly, providing a sustained release of glucose over time.



Simple carbohydrates or sugars are made up of di- or monosaccharides and are found in both natural and processed (or refined) foods.

Fruits are high in simple sugars (the monosaccharide fructose in particular), however the fibre found in fruits slows down digestion, prolonging the release of energy.

Foods that contain processed or refined sugars such as fruit-flavoured cordials, soft-drinks, biscuits, sweets (candy), muesli bars and cakes are digested very rapidly, releasing large amounts of glucose in a very short period of time.



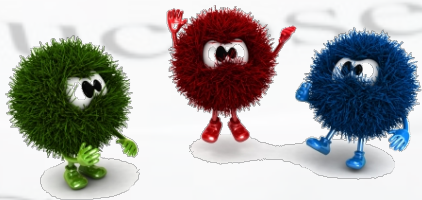
### The Glycaemic Index (GI)

The Glycaemic Index measures how quickly or slowly carbohydrates are broken down to glucose. The faster a carbohydrate is digested, the sooner glucose will enter the blood stream. Carbohydrate-rich foods are ranked on a scale from 1 (Low GI) to 100 (High GI).

High GI foods are digested quickly, releasing lots of glucose into the blood stream all at once.

Low GI foods are digested slowly, gradually releasing glucose into the blood stream over a long period of time. A diet rich in LOW GI foods is better for you than a diet rich in high GI foods.

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# Carbohydrates: An Energy Source

SLR 8

2





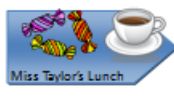
- Look at the 5 teachers' lunch items.
- In column 1, label each of the teachers' lunches with the main type of carbohydrate that is contained in each of the food items. (C = complex, S = simple sugar, SF = simple with fibre)
- In column 2, rank each lunch in order of 'high sustained energy food' to 'quick energy release food'.
- In column 3, state your reasons for ranking each lunch. You may want to mention any other food groups here too.


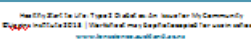

Student Learning Resource

**SLR 8** Carbohydrates: An energy source 1 of 2


**Instructions**

- The boxes contain pictures of the lunch of five staff members at 'Carbo High School'. Your job is to label the lunch in each 'lunch box' according to the type of carbohydrates that are contained in the food items. C = complex; S = simple sugars SF = simple with fibre
- Once you have labelled the food items, you need to rank the overall lunch on a scale in terms of whether you think it will provide the teachers with sustained energy through the afternoon to quick release energy food. (If you are aware of the importance of other food groups you may like to mention this in your overall reasons).

	Carb. Label	Overall Rank	Your reasons for ranking
 Miss Potter's Lunch			
 Mrs Brown's Lunch			
 Mr Hudson's Lunch			
 Mr Barker's Lunch			
 Miss Taylor's Lunch			

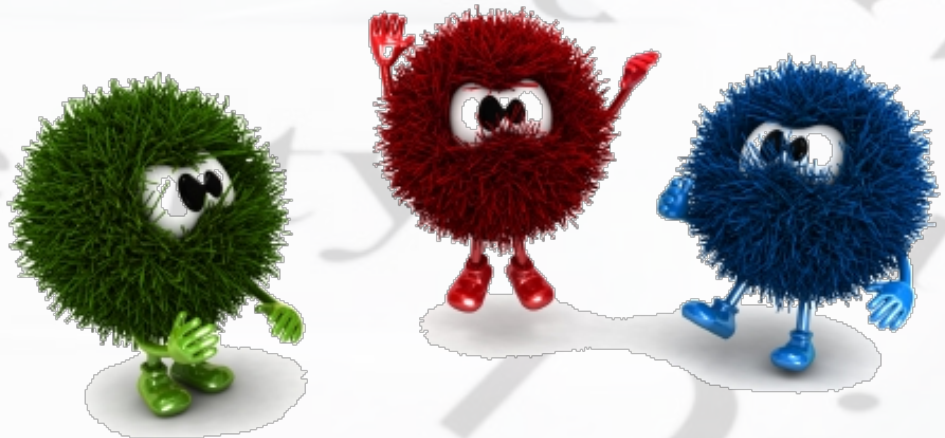




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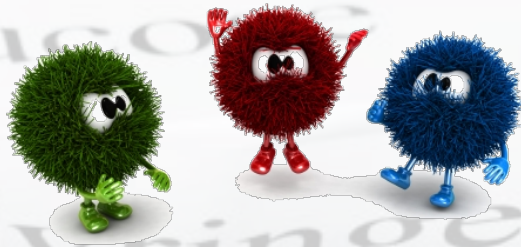


Storyboard  
time

# How does glucose get into your body's cells?







# Storyboard 1

SLR 9A

1

- Carefully read the information in SLR 9A about how glucose is digested in our body.

**Student Learning Resource**

**SLR 9a** Glucose: A journey from plate to cell

**A constant supply of energy**

- Humans need 80-90mg of glucose per 100ml of blood to survive.
- After a meal the concentration of glucose in the blood rises.
- When we don't eat the concentration of glucose in the blood falls.
- The pancreas produces two hormones that work to keep our blood glucose concentration steady.

**How do blood glucose levels stay constant?**

**INSTRUCTIONS**

Your task is to create a STORYBOARD.

- How does glucose get from the plate to the cell?
- How do blood glucose levels stay constant?

Work with a PARTNER.

Resources you can use:

- The information on this page
- The student presentation
- The KEYWORD list
- The STORYBOARD template

Think about Ws-What, Who, Where, When, Why, How.

**GLUCOSE**

**BLOOD**

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**Student Learning Resource**

**SLR 9a** Glucose: A journey from plate to cell

**Humans need energy**

- Humans need a constant source of GLUCOSE to provide energy for cells.
- Carbohydrate rich foods such as whole-grains, vegetables and fruits are the main source of energy for humans.
- When we eat a meal, carbohydrates are broken down into glucose which is transported in the blood stream to our cells.

**How does glucose get from the food we eat into our cells?**

**DIGESTION OF CARBOHYDRATES**

**LIVER**

**STOMACH**

**PANCREAS**

**SMALL INTESTINE**

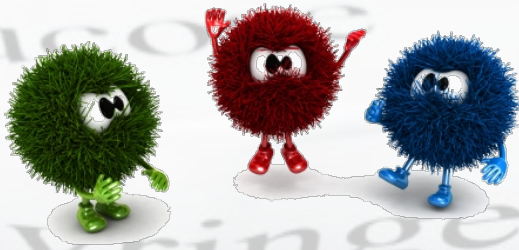
- Digestion of complex carbohydrates starts in the mouth. Saliva contains the enzyme amylase that breaks carbohydrates down to maltose.
- Carbohydrates move through the stomach into the small intestine.
- The pancreas secretes juices into the small intestine. This contains amylase for the digestion of carbohydrates.
- In the small intestine carbohydrates are broken down to glucose by enzymes (maltase, sucrase, lactase) which digest different types of sugars. Glucose is absorbed through the walls of the small intestine into the blood stream.

5. Glucose is carried in the blood to the liver from where it can:

- circulate in the blood stream to supply cells with energy
- travel via the blood stream to muscles where it is stored as glycogen
- be converted to glycogen and stored in the liver
- be converted to fat

Glucose that is stored as glycogen can be converted back to glucose when

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# Storyboard

SLR 9A

2

Your task is to create a storyboard to explain two ideas to your peers

1. How does glucose get from the food we eat into our body cells?
2. How do blood glucose stay steady?

Student Learning Resource

SLR 9a Glucose: A journey from plate to cell 2 of 2

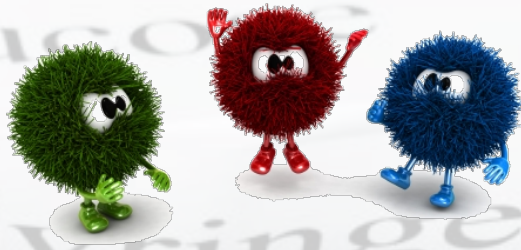
STORYBOARD

1.	2.
3.	4.
5.	6.

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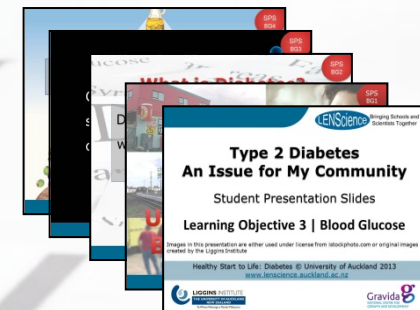
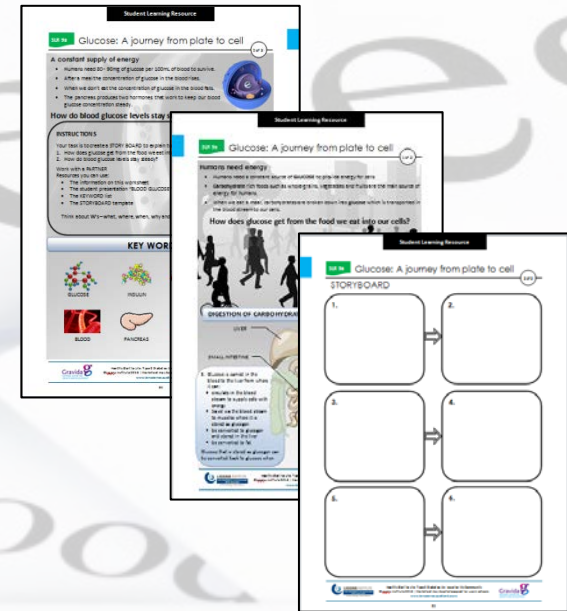
# Storyboard

SLR 9A

3

To complete this task, you may use ...

- The information on these worksheets
- The student presentation 'Blood Glucose'
- The keyword list
- The storyboard template

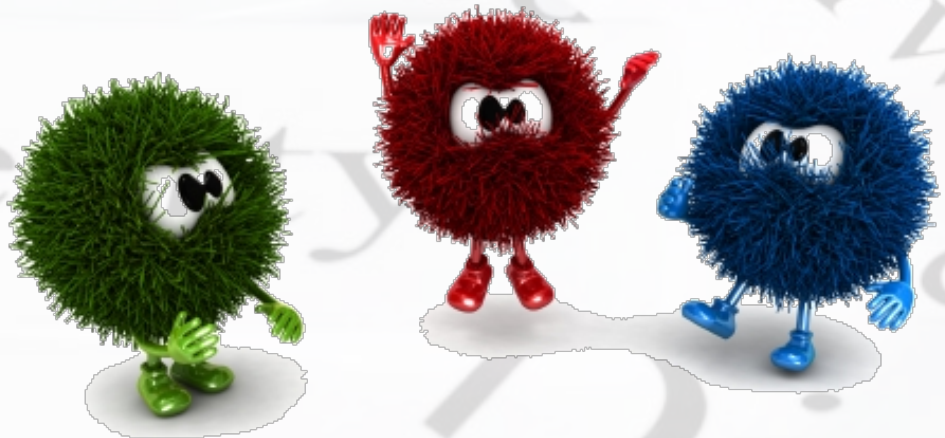




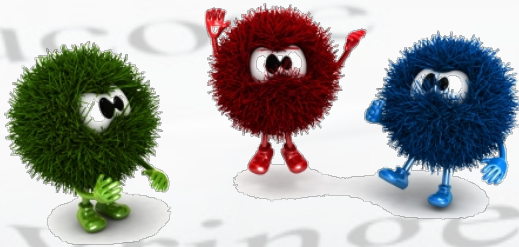


Picture  
dictation

**How does  
glucose get  
into your  
body's cells?**





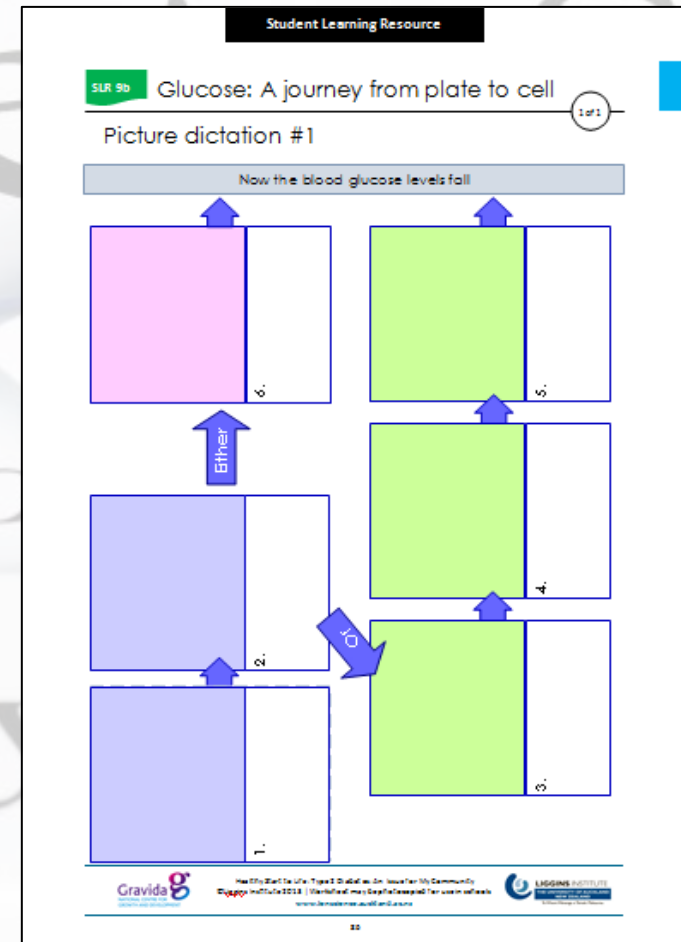


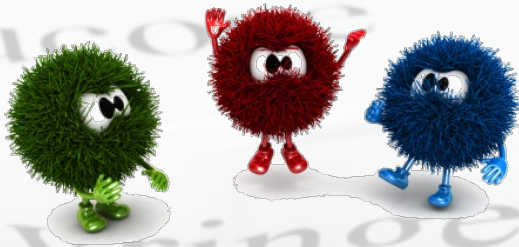
# Picture Dictation

SLR 9B

1

- You will find some information about this activity in the Student Presentation Slides: Blood Glucose (SPS BG).
- Using the sheet SLR 9B, listen carefully to each sentence and then draw a picture in the appropriate box, to represent that sentence.
- Drawings do not need to be works of art. You may use labels for chemicals and structures.



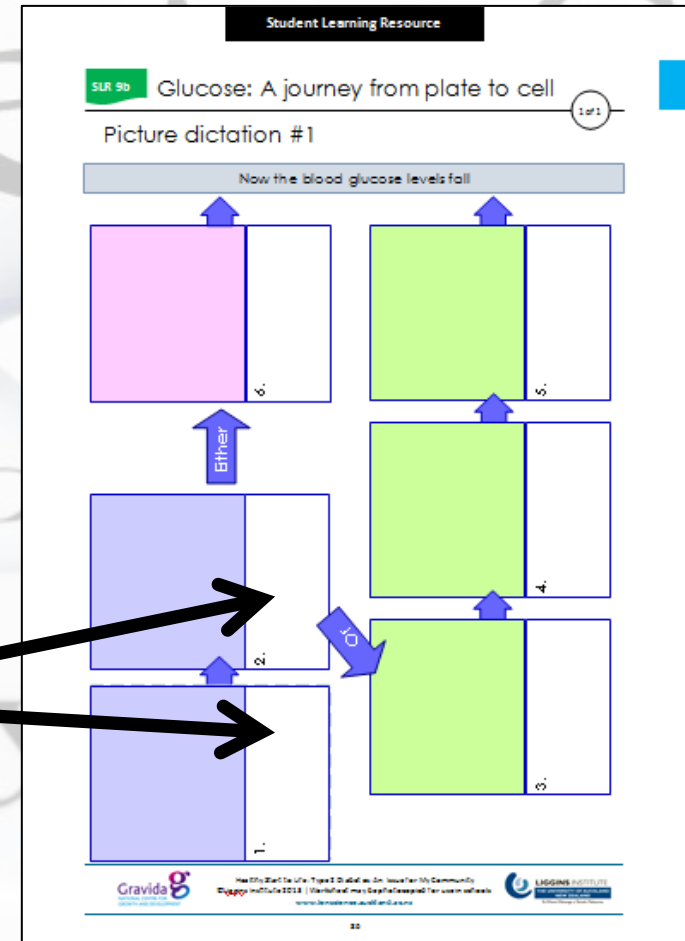


# Picture Dictation

SLR 9B

2

- Get into pairs and talk to each other about the journey of glucose from the plate to your cells, using the pictures you have drawn.
- Write a caption in the space below each box to describe what you have drawn.

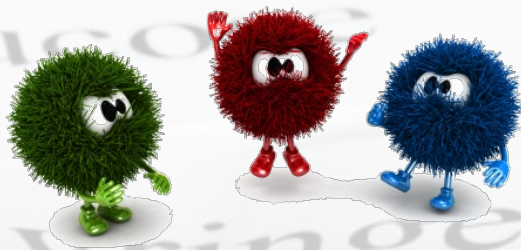




Sequencing  
activity

# How does glucose get into your body's cells?



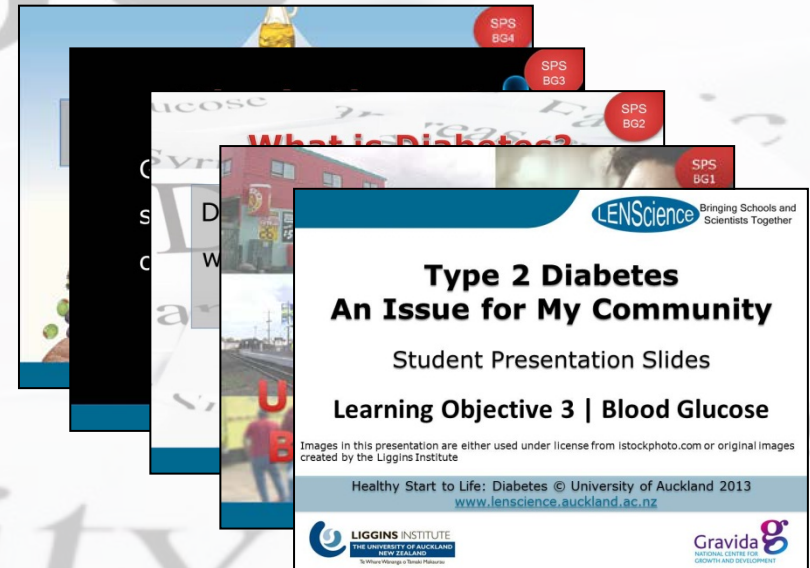


## Sequencing Activity

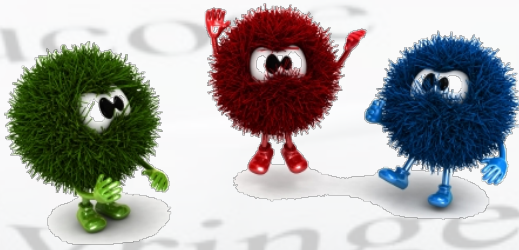
SLR 9C

1

To help you complete this task, you will need to view the Student Presentation Slides 'Blood Glucose'.







# Sequencing Activity

SLR 9C

1

- Working in pairs, read the statements in the boxes on the SLR 9C.
- Decide on the correct order they should go in.

Student Learning Resource

**SLR 9C: Glucose: A journey from plate to cell**

**Humans need energy**

- Humans need a constant source of **GLUCOSE** to provide energy for living.
- Carbohydrate rich foods such as whole-grains, vegetables and fruits are the main source of energy for humans.
- When we eat a meal, carbohydrates are broken down into glucose.
- Glucose is a very small molecule. It can travel around the body in our blood stream.

**How does glucose get from the food we eat into our cells?**

**INSTRUCTIONS: Work in pairs**

1. Read the statements in the boxes below.
2. Decide which order they should be in.
3. Copy each statement into the Sequencing Activity template or cut and paste them in.
4. Draw a diagram to represent each stage. (Quick and neat is good)
5. Join up with another pair and share your work. Compare your work and explain your decisions.

**BLOOD STREAM**

Carbohydrate

If there are cells that need glucose for energy (e.g. muscle cells) Insulin moves to the cells and attaches to the surface of the cell.

This allows the glucose to move into the cell where it can be used for energy.

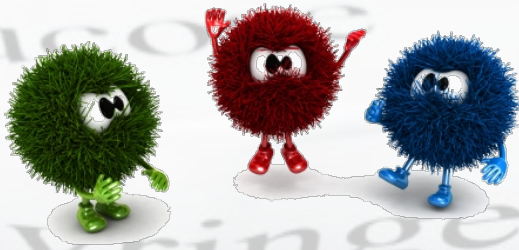
If the cells don't need glucose for energy the glucose moves to the liver where it is stored.

When the pancreas receives a message that there are higher levels of glucose in the blood it releases Insulin into the blood stream.

After the food we eat is broken down into glucose in the small intestine it can move out into the blood stream.

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## Sequencing Activity

SLR 9C

2

- Copy or cut each box and position into the 'Sequencing Activity' template.
- Draw a diagram to represent each stage (quick and neat is good).
- Join up with another pair to share and compare your work. Explain your decisions.

