



SWINBURNE
SENIOR SECONDARY COLLEGE

Name _____

Food Studies – Transition and Holiday Homework 2022

Unit 3 – Food in Daily Life AOS 1 – The science of food

The activities in this booklet are **coursework tasks** and as such must be completed in order to be successful in Food Studies. This is due on the first day/lesson back in 2023

Lesson 1: Exploring Taste

Key Knowledge and Skills

KK 1.1: the physiology and conditioning of appetite, satiety and the sensory appreciation of food

KS 1.1: explain appetite, satiety and the sensory appreciation of food

Learning intention

To explore taste and the use of human senses for evaluating food.

Success criteria

By the end of this lesson, I will be able to: recognise different tastes in food samples, describe different tastes in food samples and accurately use descriptors from the sensory wheel provided, applying these to food samples.

Definitions/Glossary – write definitions to these terms

| | |
|----------------------|--|
| Appetite | |
| Sensory appreciation | |
| Physiology | |
| Five senses are | |
| descriptors | |

Entry task: Thinking about... 5 min

Write down what you know about sensory appreciation of food and why you think we discuss this at the beginning of Unit 3.



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Topic intro:**Activity: Exploring and describing tastes and flavours 35 min**

We will explore, identify and describe tastes, texture and flavours, discovering the five tastes via the samples provided. You can taste each sample and decide which taste the sample is representative of:

| TASTES | Today's examples | Other examples you can think of |
|--|------------------|---------------------------------|
| sweet | | |
| sour | | |
| bitter | | |
| salty | | |
| umami | | |
| fat (still to be determined if an actual taste). | | |

Sensory analysis of food

Sensory assessment scales

Sensory analysis is the use of a person's senses to analyse food samples. There is a whole science dedicated to this. There are various reasons for a food company to use people to analyse food products, for example to determine whether a change in a product recipe can be detected, or to assess preferences for certain products over others.

Record results for each provided chocolate sample for two attributes – bitterness of the samples and graininess of texture (mouthfeel).

Sensory assessment scale – bitterness

| Sample | no bitterness | very slightly bitter | slightly bitter | moderately bitter | quite bitter | very bitter | extremely bitter |
|--------|---------------|----------------------|-----------------|-------------------|--------------|-------------|------------------|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |

Sensory assessment scale – mouthfeel

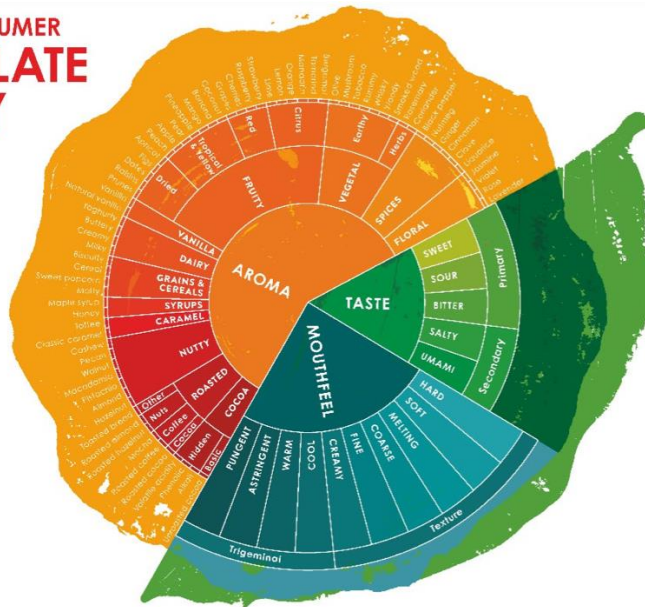
| Sample | completely smooth texture | very slightly grainy | slightly grainy | moderately grainy | quite grainy | very grainy | extremely grainy |
|--------|---------------------------|----------------------|-----------------|-------------------|--------------|-------------|------------------|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |

Exit ticket: Use the Chocolate Sensory Wheel 10 min

You should now apply what you have learnt by demonstrating your ability to use the Consumer Chocolate Sensory Wheel and identify some of the flavours and tastes described here.

The wheel was developed by a team of chocolate and cocoa scientists and specialists led by Barry Callebaut and the 'flavour house' Givaudan. It is said to be 'the first serious attempt rooted in science to create a sensory language for the chocolate industry.'

THIS IS THE CONSUMER CHOCOLATE SENSORY WHEEL



1. Access the Consumer Chocolate Sensory Wheel online.
2. Take a small piece of chocolate from previous samples
3. Place it on your tongue and allow it to melt on the tongue, before swallowing.
4. Note/circle/highlight the different flavours you can identify
5. List as many descriptive words you can identify using the sensory wheel.

6. Reflect on the different flavours you experience between when the chocolate is in the mouth to when it is swallowed (after taste) and write them down here as well

Lesson 2: Satiety

Knowledge and skills

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| KK 1.1: the physiology and conditioning of appetite satiety and the sensory appreciation of food |
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| |
|---|
| KS 1.1: explain appetite satiety and the sensory appreciation of food |
|---|

Learning intention

Today we are learning about satiation and how to achieve this through food selection.

Success criteria

By the end of this lesson, I will be able to: identify the satiating ingredients or components in a meal.

Definitions/Glossary – write definitions to these terms

| | |
|------------------------|--|
| Satiety | |
| Hunger | |
| Dietary fibre | |
| Gastrointestinal tract | |
| | |

Entry task: What is satiety? 3 min

Talk to the person next to you. Discuss and identify what foods make you feel full the most quickly.



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Topic intro: Satiation 12 min

Read the provided *background information* and definitions on the next page to gather a basic understanding of satiation.

Look at the satiety index via the information presented at the top of the provided worksheet *Using the satiety index*.

Background information - Student notes: Satiation – definitions

GIT: gastrointestinal tract – human digestive tracts as a part of the whole human digestive system.

Satiety: the feeling of being full and no longer hungry after eating food.

Dietary fibre: non-digestible plant materials the human digestive system cannot breakdown (digest). There three main forms of this: soluble fibre, insoluble fibre and resistant starch. All three types of fibre act to bulk up your stools and can be used as a food source for good bacteria in your large intestine. Fibre in foods also aids satiety as it slows down the emptying of the GIT.

Soluble fibre: soluble fibre draws water into your gut, which softens your stools and supports regular bowel movements.

Insoluble fibre: insoluble fibre attracts water into your stool, making it softer and easier to pass with less strain on your bowel. Insoluble fibre can help promote bowel health and regularity. It also supports insulin sensitivity, and, like soluble fibre, may help reduce your risk for diabetes.

Resistant starch: resistant starch has characteristics of both insoluble and soluble fibre. Much like insoluble fibre, it's 'resistant' to digestion and passes into the colon undigested, but once there, it behaves like soluble fibre and is fermented (digested) by the good bacteria that live there.

Resistant starch is considered a fibre as it resists digestion. It is found in high quantities in foods that contain starch and have been cooked and cooled. The process of cooking and cooling causes the native structure of starch to re-arrange and it then becomes resistant to digestion in the human digestive system. This is also why some foods that are very high in the satiety index are there – plain boiled potatoes are one of the highest listed foods on this index as they contain very high amount of resistant starch and offer a high level of satiety due to this. Other foods that resistant starch forms in after cooking and cooling are pastas, rice and root vegetables besides potatoes, such as sweet potato and parsnips.

Eating these foods will ensure you stay fuller for longer and perhaps eat less overall – great for those wanting to manage their weight!

Worksheet: Using the satiety index

What is the satiety index?

The satiety index provides a way to measure different foods for their ability to help a person to feel full. It's an excellent tool for choosing the right foods for a weight-loss food program. It tells you how you can minimise your hunger pangs, making it easier to follow your weight loss intentions. The satiety index tool ranks different foods on their ability to satisfy hunger. The index is based on a study performed at the University of Sydney by researcher Dr Susanne Holt, which compared the filling effects of different foods. It's clear that certain foods satisfy hunger much better than others. The test was done by giving a group of volunteers portions of 240 calories from different food sources and then measuring how much they ate when they were allowed to eat again after two hours. The index only takes into consideration for how long a certain food will keep you full; it doesn't say anything about nutritional value or calorie content.

The satiety index list

All of the following foods are compared as a percentage of satiety provided by a slice of white bread, which is ranked as '100'.

| Bakery products (%) | |
|---------------------|-----|
| croissant | 47 |
| cake | 65 |
| doughnuts | 68 |
| cookies | 120 |
| crackers | 127 |

| Fruits (%) | |
|------------|-----|
| bananas | 118 |
| grapes | 162 |
| apples | 197 |
| oranges | 202 |

| Breakfast cereals with milk (%) | |
|---------------------------------|-----|
| muesli | 100 |
| Sustain | 112 |
| Special K | 116 |
| Cornflakes | 118 |
| Honeysmacks | 132 |
| All-Bran | 151 |
| porridge/oatmeal | 209 |

| Carbohydrate-rich foods (%) | |
|-----------------------------|-----|
| white bread | 100 |
| French fries | 116 |
| white pasta | 119 |
| brown rice | 132 |
| white rice | 138 |
| grain bread | 154 |
| wholemeal bread | 157 |
| brown pasta | 188 |
| potatoes, boiled | 323 |

| Protein-rich foods (%) | |
|------------------------|-----|
| lentils | 133 |
| cheese | 146 |
| eggs | 150 |
| baked beans | 168 |
| beef | 176 |
| ling fish | 225 |

| Snacks and confectionary (%) | |
|------------------------------|-----|
| Mars Bar | 70 |
| peanuts | 84 |
| yoghurt | 88 |
| crisps | 91 |
| ice cream | 96 |
| jellybeans | 118 |
| popcorn | 154 |

Recipe analysis: Potato hash

Read the recipe below and answer the questions that follow.

Perfect potato hash

Serves 4–6

Prep: 5 minutes

Cook time: 20–25 mins

Ingredients

1 kg red-skinned potatoes (about 3 large)

1¼ tsp course-grained salt, divided (½ + ¾), plus more as needed

1 small brown onion

1 small red capsicum

4 cloves garlic

½ small bunch fresh parsley

25 g parmesan cheese, finely grated (about ¼ cup), plus more for serving

2 tbsp olive oil

2 tbsp unsalted butter

¼ tsp freshly ground black pepper, plus more as needed

½ tsp sweet paprika

Instructions

1. Dice the potatoes into 2 cm cubes. Place in a medium saucepan, add ½ teaspoon of the salt, and cover with cool water by at least 3 cm. Bring to boil over medium-high heat. Reduce the heat as needed and simmer until just tender, 7–8 minutes.
2. Drain the potatoes. Transfer to a baking tray and spread out into a single layer to air dry. Meanwhile, dice the onion and the capsicum. Finely mince the garlic cloves. Coarsely chop fresh parsley leaves until you have ¼ cup.
3. Heat olive oil and unsalted butter in a large, heavy-bottomed frypan over medium-high heat until shimmering. Add the onion and capsicum and cook until beginning to soften, about 3 minutes. Add the potatoes and season with the remaining ¾ teaspoon salt and the black pepper. Cook, stirring occasionally, until the potatoes, onion and capsicum are browning, about 5 minutes. (This will depend on the size of your pan. If the vegetables aren't browning after a few minutes, increase the heat to high.) Add the garlic and stir until fragrant and light golden-brown, about 1 minute.
4. Remove the pan from the heat. Add the parsley, the grated parmesan, and sweet paprika, and stir to combine. Taste and season with more salt and black pepper as needed. Sprinkle with more parmesan before serving.

Source: *The Kitchn* (online magazine)

Activity: Using the satiety index 35 min

Using the provided Recipe, analyse the Potato hash recipe for its satiety level. Then complete the discussion questions, providing suggestions for modifications to improve the recipe.

The foods listed in the satiety index list have percentage ratings assigned to them. Any foods that are 100 or higher offer a level of satiation that is equal (100) to white bread or higher. The higher the percentage score assigned to a food; the greater ability this food has to make a person feel full after consumption. Foods that are 100 or lower offer less satiation than a slice of white bread.

Reference

Holt, SHA, Brand Miller JC, Petocz, P & Farmakalidis E 1995, 'A Satiety Index of Common Foods', *European Journal of Clinical Nutrition*, September, pp 675–690.

Discussion questions

1. What foods offer the greatest level of satiation according to the satiety index foods list (list the top six most satisfying foods from the table)?

| | | |
|--|--|--|
| | | |
| | | |

2. Why do you think foods high in sugar are not listed high on this scale?

3. How may knowing the foods on the satiety index help a person with weight-related issues?

Questions

1. Would this recipe/food provide a high or low level of satiation? Give reasons for your answer.

2. Describe what is providing satiation in this recipe.

3. What could you add to this recipe to provide even greater satiation?

4. **Research question:** Identify three foods that are high in resistant starch, three foods that are high in insoluble fibre and three foods that are high in soluble fibre.

| resistant starch | insoluble fibre | soluble fibre |
|------------------|-----------------|---------------|
| | | |
| | | |
| | | |

Exit ticket: How satisfying is your food? 10 min

Think about the foods you indicated made you feel fullest the quickest in the entry task. Compare these foods to the satiety index and discuss what makes the food satisfying. Reflect on foods you could choose that would be more satisfying than your original answer.

Lesson 3: Eating and digesting food- Holiday Homework

Knowledge and Skills

KK 1.2 The microbiology of the intestinal tract and the sequential processes of the digestion of carbohydrates protein and fats including enzymatic hydrolysis, absorption and utilisation of these macronutrients in the body

KS 1.2: explain the physiology of digestion and its relationship to the absorption and utilisation of macronutrients

Learning intention

Today we are learning about the human digestive system and digestive processes.

Success criteria

By the end of this lesson, I will be able to: identify the parts of the digestive system and where the different types of digestion – mechanical and chemical – occur, and the absorption of macronutrients.

Definitions/Glossary – write definitions to these terms

| | |
|----------------------|--|
| Chemical Digestion | |
| Mechanical digestion | |
| enzymes | |
| Enzymatic hydrolysis | |
| macronutrients | |

Activity: Unravelling the complexity of human digestion

Watch a selection of videos examining the internal processes of digesting foods in the human body. The following links are listed in order of simplicity, progressing to those that are more in-depth.

Gums to bums (YouTube, TeachersTV, 3.35 mins) – Covers digestion in a practical sense, as a demonstration via experimentation of what occurs as food is digested.

<https://www.youtube.com/watch?v=0gY-zXsUYgs>

Your digestive path (YouTube, Stanford Digestive Health Centre, 1.55 mins) – Easy to understand and covers basic functions of digestion.

<https://www.youtube.com/watch?v=vLgH0Pvd9xY>

How the digestive system works (TedEd, Emma Bryce, 4.57 mins) – A bit more in-depth than the above video.

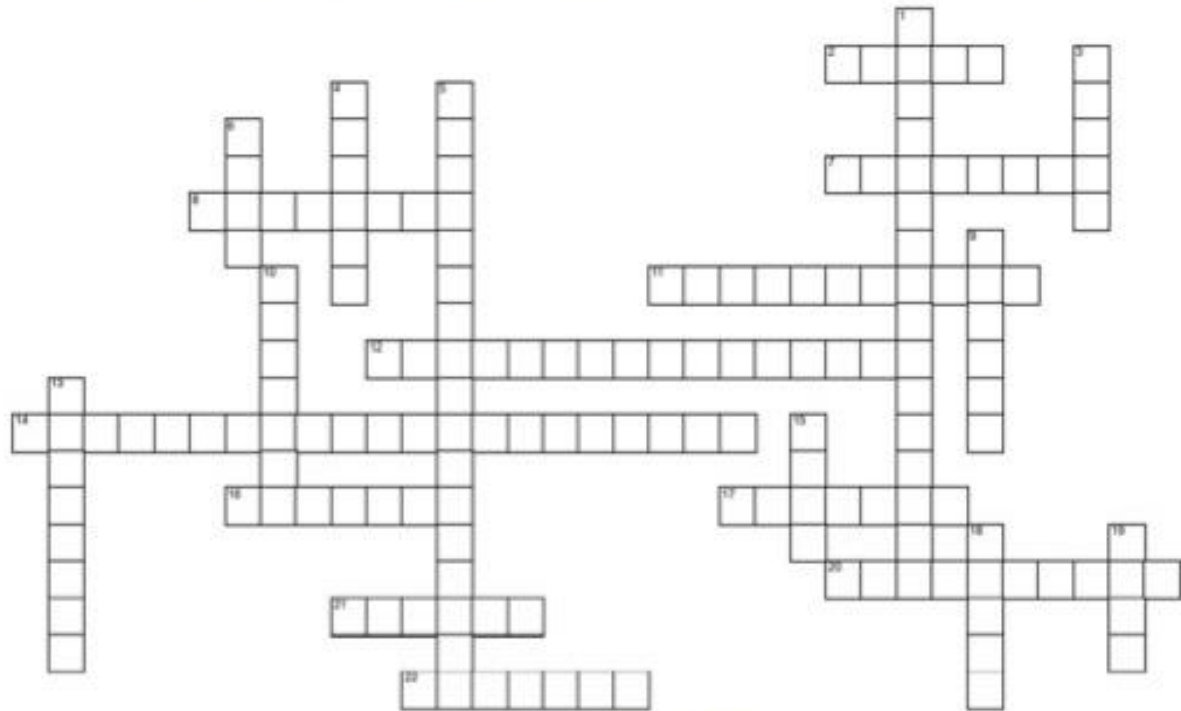
<https://www.youtube.com/watch?v=Og5xAdC8EUI>

Worksheet: Eating and digesting food

Using the information provided by the videos, complete the following crossword puzzle.

NB: For puzzle answers, see [Student notes: Crossword solution](#).

Human digestion crossword



Source: Puzzle generated at www.puzzle-maker.com/CW

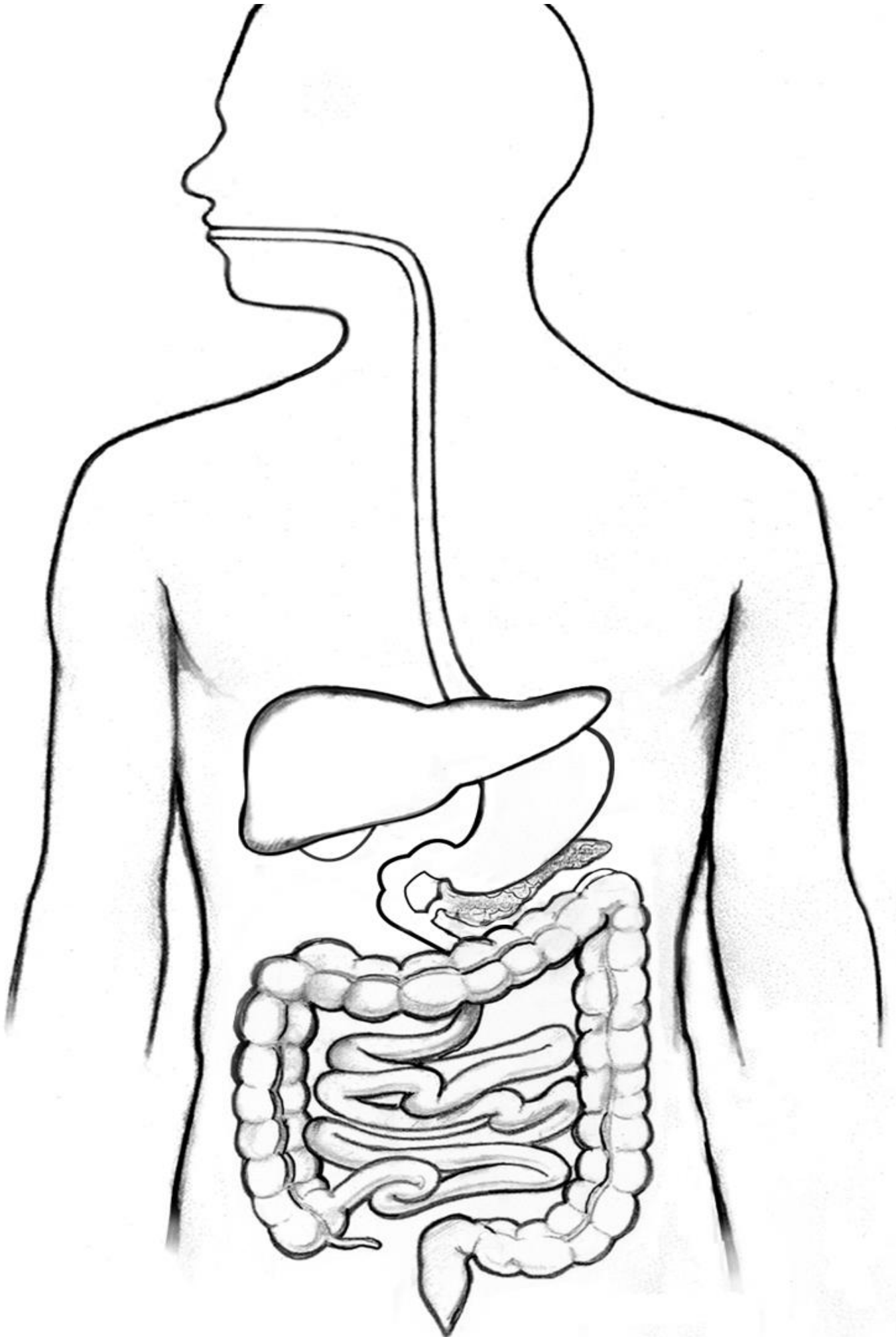
Crossword puzzle clues

Across

- 2 liquid that leaves the stomach
- 7 enzymes that breakdown proteins
- 8 first section of the small intestine
- 11 muscular contractions in the oesophagus
- 12 opening to the stomach
- 14 food travels via this to breakdown food and absorb nutrients
- 16 enzymes that breakdown carbohydrates
- 17 churns food that enters here; also makes you feel satiated
- 20 water splitting
- 21 is produced at the beginning of the digestive process
- 22 catalyses chemical reactions

Down

- 1 acidic compound found mainly in the stomach
- 3 sends bile to the duodenum
- 4 final section of the small intestine
- 5 process using naturally occurring chemicals to digest food
- 6 waste material leaves the body via this
- 9 enzymes that breakdown fats
- 10 second section of the small intestine
- 13 produces many digestive enzymes that then travel to the duodenum
- 15 the body needs this to process nutrients
- 18 common or overarching name for major absorption processes during digestion
- 19 emulsifies fats; helps with digestion of fats



Trivia questions

1. What is the common ending for many enzyme names?
2. What do your eyes have to do with the digestive processes?
3. What is a common phrase to describe salivating?
4. Name three organs in the digestive system.
5. What is the name of the organ where bile is stored?
6. What is simple name for carbohydrates?