

LESSON PLAN

HEALTH & NUTRITION

HEALTHY BONES
AND TEETH



LESSON OVERVIEW



In the final lesson of this Health and Nutrition unit, students will further explore the impact of nutrition on the body by investigating what contributes to healthy bones and teeth. The aim of this lesson is for students to develop an understanding of the building blocks of healthy bones and teeth, rationalise how they can support their bones and teeth to remain healthy, as well as the many reasons for doing this. Students will explore the nutrients that can be found in bones and teeth, and consider which foods contain these nutrients. The class will also participate in a science experiment exploring the impacts of different liquids (particularly those high in sugar) on our teeth. The topic of osteoporosis will also be covered, supported by a hands-on activity that reinforces the importance of maintaining strong and healthy bones.

The activities within this lesson extend on content that has been delivered in lessons one and two. Therefore, it is recommended that you review prior knowledge with the class before commencing this lesson. Whilst the lifestyle diaries are not required in this lesson, students are encouraged to continue referring to these beyond this unit of work to further promote a healthy, happy and balanced lifestyle.

A Post-Quiz can be completed at the conclusion of this lesson to assess student understanding and how it has developed over the course of the unit. The Post-Quiz can be found at dairy.edu.au/post-quiz.

Learning Intentions

Students will understand:

- The different nutrients that contribute to building and maintaining healthy bones and teeth.
- Which foods they can eat to support optimal growth and maintenance of healthy bones and teeth.
- The effect of different liquids on their teeth.
- What osteoporosis is, and what they can do to prevent it.
- The importance of maintaining healthy bones and teeth.

Resources

- Access to an IWB is recommended throughout this lesson.
- Playdough (½ cup per child)
- Straw or hay (½ cup per child)
- Uncooked spaghetti or pop sticks (10 pieces per child)
- A range of different liquids for the experiment (we recommend orange juice, cordial, water, and a soda)
- 4 transparent cups
- 4 eggs
- **Build A Skeleton** game from Dairy Australia at <https://www.dairy.edu.au/resources/interactive-resource/build-a-skeleton-interactive-game>
- **Post Quiz** from Dairy Australia at dairy.edu.au/post-quiz

Assessment

There is an informal assessment opportunities throughout this lesson including:

- Monitoring students' participation in small and large group discussion to assess for understanding.
- Post-Quiz provides an opportunity for summative assessment.

Differentiation

As with all of our lesson plans, we encourage teachers to differentiate the activities by making any necessary modifications in order to cater for diverse student learning needs.

Note: The suggested duration of the activities found within this module may require adjustment to cater for the needs of your students.

Australian Curriculum Links

Stage Two – Health and Physical Education

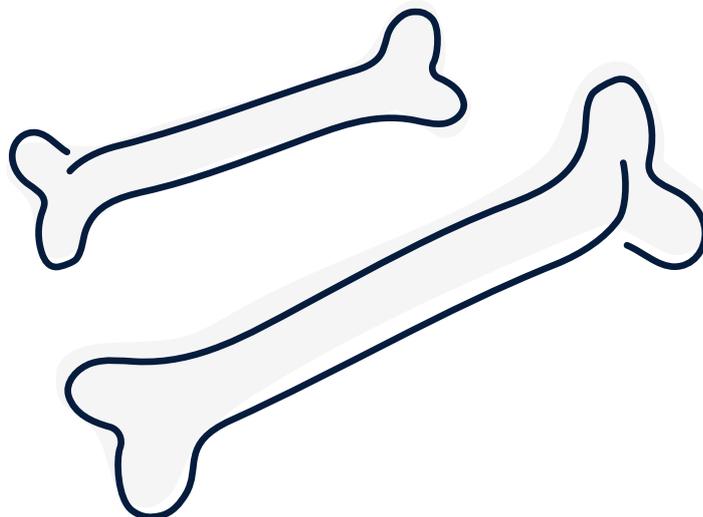
- Identify and practise strategies to promote health, safety and wellbeing (ACPPS036)
- Discuss and interpret health information and messages in the media and internet (ACPPS039)

General Capabilities

- Literacy
- Personal & Social Capability

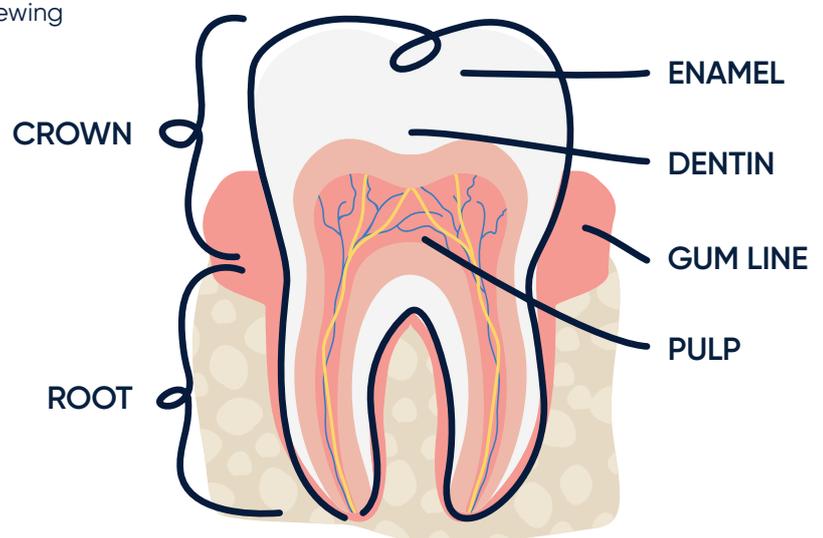
INTRODUCTION OF LESSON

1. Bring the class together and explain to students that in today's lesson they will have the opportunity to conduct a science experiment, as well as engage in another hands-on activity to explore the importance of healthy bones and teeth.
2. Invite the class to engage in a brainstorm around what features make up strong and healthy bones. The building blocks of bones are the nutrients that help our bones to grow strong and maintain their health. This is important because without bones we would have no skeleton. Brainstorm with the students what humans might look like if we didn't have a skeleton: what would happen to our bodies?
3. Explain to the students that the major nutrients that can be found in our bones include:
 - **Calcium** – Calcium is the main building block of a healthy bone. It binds together with other minerals, forming hard crystals that gives our bones strength.
 - **Phosphorus** – Phosphorus is just as important for bones as calcium. It is essential for the formation and maintenance of strong bones.
 - **Zinc** – Zinc plays an important role in the natural process of breaking down old bones to replace with new bone.
 - **Protein** – Protein is needed to achieve and maintain an ideal bone mass throughout a lifetime.
 - **Potassium** – Potassium is involved in decreasing acidity levels within the body, allowing calcium to thrive.
 - **Magnesium** – Magnesium plays two important roles. It helps to control calcium levels within the bones to keep it at an optimum, as well as providing structure for the bones.
4. Brainstorm as a class what kind of foods we can eat that might provide these major nutrients for the body. Throughout the discussion remind students that whilst calcium is very important for our health, it cannot be produced in our bodies so it must come from our diet. Reinforce that of all the food groups, products that are within the dairy group provide the best foundation for our bones.
5. Working together as a class, access the **Build A Skeleton** game from Dairy Australia at <https://www.dairy.edu.au/resources/interactive-resource/build-a-skeleton-interactive-game> and complete the interactive game. Alternatively, students can complete this activity independently; and they may also choose to play again at home depending on time and access permissions.
6. Assign students the playdough people challenge. In this challenge students are tasked with creating two playdough people, using two different materials as the skeleton.
7. Students are to create their playdough people, one with a skeleton of straw and another with a skeleton of uncooked spaghetti.
8. Encourage students to consider which playdough person has the strongest skeleton. This will also provide a visual opportunity for students to explore the importance of maintaining strong and healthy bones, and the possible consequences of not taking steps to support this. Discuss findings.



STRUCTURE OF LESSON

1. List a range of different body parts, asking students to give a thumbs up if they think that body part is similar to bones, or give a thumbs down if they think that body part is very different to bones. Body parts that can be listed include: brain, nails, hair, eyeballs, teeth. When the class reaches teeth, explain to students that teeth and bones are very alike, because they both need calcium from food to be healthy.
2. As a class, jointly construct a mind-map brainstorming answers to the question 'What makes up a tooth?'
3. Explain to the students that there are six different parts of a tooth. Use the below diagram to assist.
4. Parts of a tooth are as follows:
 - **Pulp** – The pulp is the soft tissue that is found at the centre of all teeth. This is where the nerve tissue and blood vessels are.
 - **Root** – The root is the part of the tooth that is embedded in the bone. It makes up about two-thirds of the tooth and helps to keep it in place.
 - **Gum Line** – This is where the tooth meets the gums.
 - **Dentin** – The layer of the tooth underneath the enamel.
 - **Enamel** – The outermost layer of the tooth. It is the hardest tissue in the body with the most minerals.
 - **Crown** – The top part of the tooth, which is the part that you can normally see. The shape of the crown determines the tooth's function. For example, the front teeth are pointy for biting into food and the back teeth are more flat for chewing the food.
5. Explain to students that we will now be conducting an experiment that will show how different liquids affect our teeth over time. This is an opportunity to consider the scientific method together as a class. The details of this experiment can be found at the end of this lesson plan. We recommend that students conduct this experiment in small groups.
6. Display a Venn Diagram on the board. Title one circle '**What healthy bones need**', and the other circle '**What healthy teeth need**'. Ask students to contribute their learnings from the lesson and place their ideas in the relevant circle. There will be a lot of crossover in the Venn Diagram, as healthy bones and teeth need the same nutrients.
7. Ask students to brainstorm answers to the question: 'What is osteoporosis, and what causes it?'
8. Explain to the students that osteoporosis is what occurs when bones lose their calcium and the other major nutrients essential for bone health, making bones more likely to fracture or break because they are so fragile.
9. Osteoporosis currently affects 1.2 million Australians, with this number expected to grow. It currently affects 1 in every 5 women and approximately 1 in 20 men.



CONCLUSION, FURTHER READING & POST QUIZ QUESTIONS

Conclusion of Lesson

Review the importance of maintaining strong and healthy bones as a class. By consuming calcium-rich food, dairy in particular, as well as participating in regular exercise and engaging in safe exposure to the sun, students are taking active steps in promoting their own bone and oral health. It is important that we look after our bones and teeth because they are responsible for many important functions within the body. To support and reinforce this idea, you may like to revisit the students' ideas at the beginning of our class regarding what the human body might look and operate like if it had no skeleton.

Further Reading and References

- Colgate. (2019). What are the different parts of a tooth?
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- Victorian Department of Health & Human Services. (2018). Bones.
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Post Quiz Questions

1. Dairy is an important part of any balanced diet because it provides calcium and other essential nutrients for the human body to grow, move, and maintain healthy bones and teeth. **(True)**
2. Osteoporosis occurs when bones lose calcium and other minerals, making them more fragile, and more likely to sustain fractures and breaks. **(True)**
3. The food that we eat does not have an impact on how we perform in sporting activities. **(False)**
4. A balanced diet includes a range of foods from the five food groups: proteins, vegetables, fruits, grains and dairy. **(True)**
5. Setting a SMART goal means that you have set an unreasonable goal that will be difficult to achieve. **(False)**
6. The food we eat has both short, medium and long-term effects on our bodies and overall health. **(True)**
7. The building blocks of bones include calcium, protein, zinc and potassium. **(True)**
8. The cranium, spine, sternum, tibia and clavicle are some of the bones that make up the human skeleton. **(True)**
9. The skeleton does not provide protection for the vital organs inside our bodies, such as the heart, brain and lungs. **(False)**
10. It is recommended that athletes do not ingest dairy products, as they do not provide them with the vitamins and minerals required for muscle growth and repair. **(False)**

Eggs in Liquid Experiment

Question:

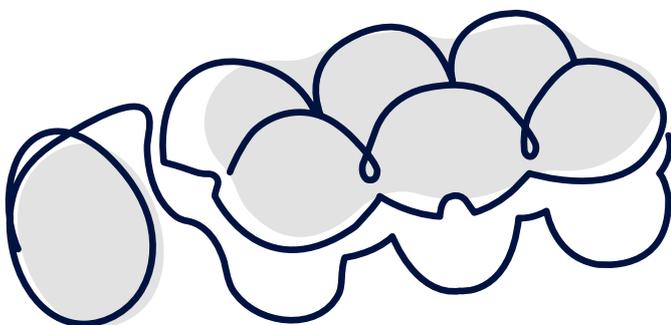
Do the liquids we drink have an affect on the health of our teeth?

Hypothesis:

Work together as a class to create your hypothesis, we recommend asking students to recall what they already know when forming this.

Method:

1. Place 4 plastic cups in a line on a table.
2. Fill the first plastic cup with cordial until it is half-full.
3. Fill the second plastic cup with water until it is half-full.
4. Fill the third plastic cup with soda until it is half-full.
5. Fill the fourth plastic cup with juice until it is half-full.
6. Carefully place one whole, boiled egg in each plastic cup. The shell should still be on the egg.
7. Record any initial differences in the eggs immediately.
8. Place the four plastic cups in a safe place.
9. Leave the eggs in the liquids for approximately 4 hours, or overnight if possible.
10. Record any differences in the eggs once the allotted period of time has passed



Results:

Students will record their results at the beginning of the experiment, and again after the eggs have had a longer period of time in their liquids.

Conclusion:

Students consider whether this experiment has been successful in answering their question. Students reflect on whether their hypothesis was correct, and note any questions that they may still have as a result of this experiment.

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