

OSTEOPOROSIS AWARENESS WORKBOOK

PDHPE STAGE 4 TEACHER WORKBOOK

STUDENT NAME:



INTRODUCTION

WHY OSTEOPOROSIS AWARENESS?

Osteoporosis is a common disease affecting over 1 million Australians. This disease makes bones become brittle leading to a higher risk of breaks than in normal bone. Osteoporosis occurs when bones lose minerals, such as calcium, more quickly than the body can replace them, causing a loss of bone thickness (bone density or mass). Thus, bones become more porous and less dense so that even a minor bump or fall can result in a fracture.

Bones have many critical functions in our body. For children, strong healthy bones assist in reaching their optimum growth level. Bones reach their peak bone mass in your 20s, which is when our bones are at their strongest. For adults, strong healthy bones mean you can maintain your bone density and lead a fit and active life well into old age. Strong bones reduce the risk of fractures in later life.

WITHIN THIS
WORKBOOK:

02 *LESSON ONE*

05 *LESSON TWO*

08 *LESSON THREE*

11 *LESSON FOUR*

THE IMPORTANCE OF BONES

ACTIVITY ONE (core)

1(a) Osteoporosis Awareness video

Please watch the Osteoporosis Awareness video - https://youtu.be/pkGX_RJ_sXA

You can also view it in 360 degrees on the Youtube App - <https://youtu.be/TeCXhin4koE>

Complete the first two activities online in Lesson one with Mrs Cooper (<https://mshhealthresearch.com/osteoporosis-lesson-1>). Once completed, using these websites to assist you, research, and answer the following questions:

- <https://www.osteoporosis.foundation/health-professionals/about-osteoporosis/bone-biology>
- <https://www.healthline.com/health/bone-health/bone-function>
- <https://sciencing.com/five-main-functions-skeletal-system-5084078.html>



*To thrive in life
you need three
things: a
wishbone, a
backbone and a
funny bone."*

1(b) What are bones?

1(c) Why are bones important to us?

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



LESSON ONE

ACTIVITY TWO (core)

Using this video (<https://youtu.be/vDjW00S29I0>) as well as the activities 'Different Types of Bones' and ' Bone Functions' with Mrs Cooper (<https://mskhealthresearch.com/osteoporosis-lesson-1>), record the main types of bones presented and their function in the table.

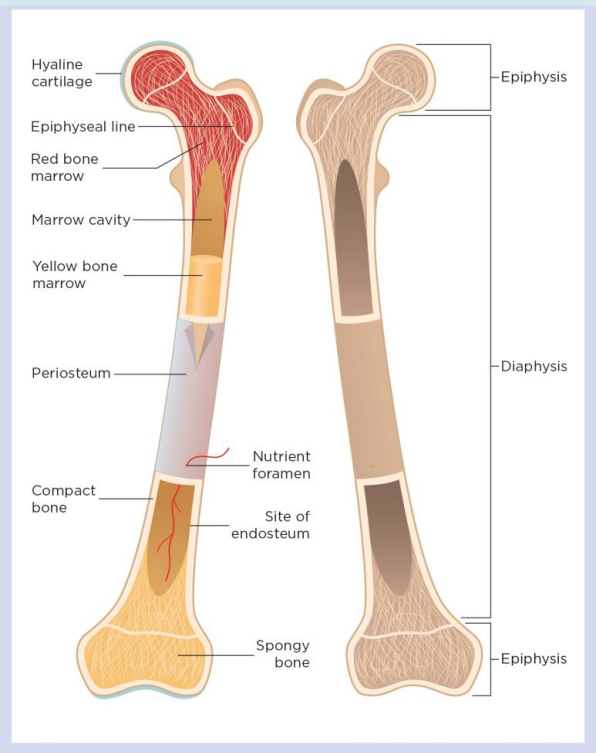
Type of bone:	Function of bone:



ACTIVITY THREE (core)

Complete the next two activities with Mrs Cooper (<https://mskhealthresearch.com/osteoporosis-lesson-1>), watching the 'Parts of a Long Bone' video (<https://youtu.be/6PQ5Rv6ONfY>) as well as the diagram drop box. Using this information, outline the main function of each part of the bone below and complete the diagram with the missing parts:

Part of bone:	Main function of bone:
Diaphysis (The Shaft)	
Epiphysis	
Osteoclasts	
Osteocytes	
Osteoblasts	
Bone Marrow	
Collagen	
Periosteum	



LESSON ONE

ACTIVITY FOUR (extension)

In pairs, using this YouTube clip as a guide (<https://youtu.be/UYSOe06j4ps>), create your own 'All About Bones' song. Your song needs to include:

- A definition of what bones are.
- Why bones are important to humans.
- The different parts of a bone and the function of them.



You can record your song using Flipgrid, or you can write your lyrics below and present them using Canva or another publishing resource.

Planning Space for 'all about bones' song:

Remember to complete the online quiz with Mrs Cooper at the end of the lesson!
<https://mskhealthresearch.com/osteoporosis-lesson-1>

Once you have completed Lesson 1 please complete this short survey
<https://redcap.sydney.edu.au/surveys/?s=WJDH78DEDL93JNEC>

LESSON ONE



ACTIVITY ONE: ANSWERS

1(b) What are bones?

Bones have many critical functions in our body. Bones in our body are living tissue. They have their own blood vessels and are made of living cells, which help them to grow and to repair themselves.

1(c) Why are bones important to us?

1. Structural support
2. Enable movement
3. Protection. Your skeleton helps protect your internal organs and fragile body tissues. The brain, eyes, heart, lungs and spinal cord are all protected by your skeleton. Your cranium (skull) protects your brain and eyes, the ribs protect your heart and lungs and your vertebrae (spine, backbones) protect your spinal cord
4. Provide an environment for marrow where your blood cell production takes place
5. Storage of minerals (such as calcium)
6. Endocrine regulation: collection of glands that produce hormones that control growth and development, metabolism, etc

<https://www.healthline.com/health/bone-health/bone-function>

<https://sciencing.com/five-main-functions-skeletal-system-5084078.html>



ACTIVITY TWO: ANSWERS

Type of bone:	Function of bone:
Long bones	Act as levers, as in the arms and legs.
Flat bones	Shield and protect, as in the sternum and ribs.
Short bones	Span spaces and give added flexibility, as in small bones in wrist.
Irregular bones	Vary in shape and protect organs or are attached to tendons (knee cap).



LESSON ONE



ACTIVITY THREE: ANSWERS

Part of bone:	Main function of bone:
Diaphysis (The Shaft)	The main part of the bone.
Epiphysis	Forms the joint at either end of the bone.
Osteoclasts	Bone absorbing cells. The cells that break down old bone tissue.
Osteocytes	The cells that maintain bone tissue by controlling the mineral and calcium content.
Osteoblasts	The bone building cells that build bone tissue.
Bone Marrow	Produces blood cells.
Collagen	Provides support and elasticity.
Periosteum	Involved in bone growth and repair.

ACTIVITY FOUR: RESOURCES

Reference answers in Activity One to Three to identify depth of understanding.

Flipgrid: Flipgrid | Empower Every Voice. Teacher requires a login account and then setup a join code for students.

<https://info.flipgrid.com>

Canva: Students require an account, basic access is free.

<https://www.canva.com>

Other suggested resources:

Publisher/AdobeSpark/Paint

Hand drawn in workbooks also suitable

LESSON TWO

ACTIVITY ONE (core)

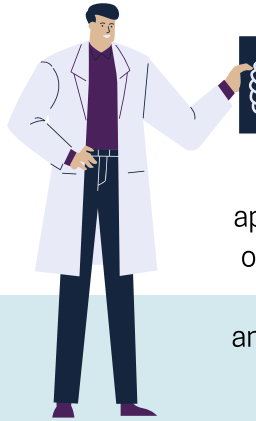
1(a) Online activities

Join Mrs Cooper online and complete 'Building Blocks to Healthy Bones', then complete the activity below.

(<https://mskhealthresearch.com/osteoporosis-lesson-2>)

1(b) Our bones require calcium, Vitamin D, and regular weight-bearing and resistance exercise for growth, development, and continued maintenance.

In pairs, research the importance of each of these requirements and write why they are important in the boxes. Then rank them from most important (1) to least important (3)



Did you know? At approximately 30 years of age, you reach peak bone mass and bone density starts declining

Adequate calcium intake:

Rank: 1/2/3

Sufficient Vitamin D:

Rank: 1/2/3

Regular weight-bearing and resistance exercise:

Rank: 1/2/3

ACTIVITY TWO (core)

Brainstorm 'ways to keep our bones healthy', using Mrs Cooper's 'What About Unhealthy Bones?' as a starting point (<https://mskhealthresearch.com/osteoporosis-lesson-2>). Now, add 'what might happen if our bones aren't kept healthy?' to your brainstorm. There is space below for your brainstorm. Record the most important points below:

LESSON TWO

ACTIVITY THREE (core)

3(a) Watch the video on Osteoporosis as a class, recording any interesting points as you go! https://youtu.be/pkGX_RJ_sXA

3(b) Using the information from the video animation, Mrs Cooper's 'Osteoporosis Fact Sheet' (<https://mskhealthresearch.com/osteoporosis-lesson-2>) and these websites:

- <https://www.osteoporosis.foundation/patients/about-osteoporosis>
- <https://healthybonesaustralia.org.au/>

As a starting point, research Osteoporosis, and identify the key points to present to another group, explaining the following:

What is the cause of Osteoporosis?

What types of bone are affected?

What are the effects of Osteoporosis?

How can Osteoporosis be prevented?



LESSON TWO

ACTIVITY FOUR (extension)

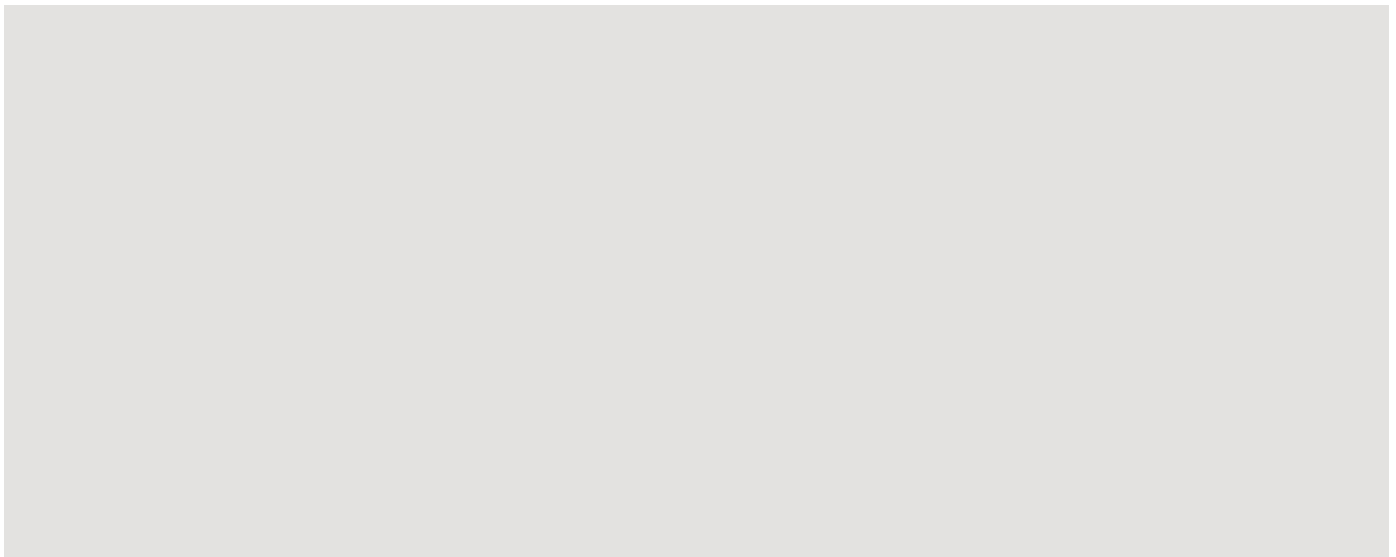
Using your research from Activity Three, create an advertisement for a selected age group within society, aiming to educate them about Osteoporosis. Age groups are: 10 - 13 years, 13 - 15 years, 15 - 17 years, 17 - 19 years or 19 - 29 years.

Include the following in your advertisement:

- Relevant information about Osteoporosis for the selected age group.
- What peer pressures may impact the selected age groups decisions around Osteoporosis.
- Images that will capture the age groups attention and educate them about Osteoporosis.

Presentation options for advertisement could include **Microsoft Publisher, Canva or Adobe Sparke**, depending on what's available! If not, a hand drawn advertisement would be great.

Brainstorming and planning space for Activity Four:



QUICK QUIZ!

Complete the online quiz with Mrs Cooper at the end of the lesson to demonstrate your learning! (<https://mskhealthresearch.com/osteoporosis-lesson-2>)

Once you have completed Lesson 2 please complete this short survey

<https://redcap.sydney.edu.au/surveys/?s=PKACHJDCDTXMLP4T>

LESSON TWO

ACTIVITY ONE: ANSWERS

Our bones require calcium, Vitamin D and regular weight-bearing and resistance exercise for growth, development and continued maintenance. The three components are ranked below from most to least important:

1. Regular weight-bearing and resistance exercise to assist in maintaining or improving bone density.
2. Adequate calcium intake, to build and maintain bones strength and flexibility, which enables the body to gain the most it can out of exercise.
3. Sufficient Vitamin D through exposure of the skin to sunlight, small amounts of dietary sources and supplementation. Vitamin D is important for bone health because it helps absorb calcium. It also plays a role in: supporting growth and maintenance of the skeleton and regulating calcium levels in the blood.

ACTIVITY TWO: ANSWERS

Ways to keep our bones healthy can include: adequate calcium intake, sufficient vitamin D and keep active through regular weight-bearing and muscle strengthening exercise.

What might happen if our bones aren't kept healthy can include: decrease in blood cells, decreased bone density, bones become brittle, increased risks of fractures and falls.

ACTIVITY THREE: ANSWERS

3(b)

What is the cause of Osteoporosis?

Osteoporosis occurs when bones lose minerals, such as calcium, more quickly than the body can replace them, causing a loss of bone thickness (bone density or mass). When bone resorption happens at a greater rate than bone forming, bone loss occurs, this leads to osteoporosis. Many factors determine how much old bone is resorbed and how much new bone is made. Some factors people have control over (such as diet), but some factors are out of their control (such as age).

Risk factors include: family history, coeliac disease, low consumption of calcium, low exposure to sunlight, lack of weight bearing exercise, low body weight, high caffeine consumption, high alcohol consumption, smoking, taking certain medications such as corticosteroids.

What types of bone are affected by Osteoporosis?

Any bone can be affected by osteoporosis, but the most common sites are the hip, spine and wrist.

What are the effects of Osteoporosis?

When you are young, most broken bones heal quickly and almost completely. People with osteoporosis fractures don't heal as well. In fact 20% of people with hip fractures die within 12 months, most are unable to walk unassisted ever again.

How can Osteoporosis be prevented?

Building a strong skeleton in early life is the best insurance against developing osteoporosis. Maintaining good bone health to prevent fracture is a life-long project, but the very best window of opportunity to build a strong and resilient skeleton is in childhood and adolescence. 90% of bone growth occurs between the ages of 10-20.

LESSON TWO

ACTIVITY FOUR: NOTES

For children, strong healthy bones assist in reaching their optimum growth level. Bones reach their peak bone mass in your 20s, which is when our bones are at their strongest. For adults, strong healthy bones mean you can maintain your bone density and lead a fit and active life well into old age. Strong bones reduce the risk of fractures in later life.

Peer pressures or barriers that may impact decisions could include: patterns in young women dropping out of sports, poor relationships with food, exams, study, stress, less structured sport in school, financial burdens and low parental support.

LESSON THREE

ACTIVITY ONE (core)

Using the World Health Organisation's definition of health provided by Mrs Cooper (<https://mskhealthresearch.com/osteoporosis-lesson-3>), develop your own personal definition of health and record it below:

ACTIVITY TWO (core)



*It is health that
is real wealth
and not pieces of
gold and silver"*

*Mahatma
Gandhi*

Complete Mrs Cooper's 'Good Health vs Poor Health' table and brainstorm the characteristics of someone who shows good physical health, compared to someone who does not. Record these on the post-it notes on the next page.



LESSON THREE

ACTIVITY TWO CON'T

GOOD HEALTH

eg: gets 8+ hours of sleep



POOR HEALTH

eg: doesn't exercise



ACTIVITY THREE (core)

Complete Mrs Cooper's 'Physically Healthy Day', identify what a physically healthy students day would look like and record the examples in the table provided. Once you've filled the table in, complete the 'Sedentary Activities' slide with Mrs Cooper. (<https://mskhealthresearch.com/osteoporosis-lesson-3>)

Activity/ Health Dimension	How much time should be spent doing this each day (Guideline):
Physical Activity	
Screentime	
Sedentary activities	
Sleep	



LESSON THREE

ACTIVITY FOUR (core)

Using the recommended physical activity guidelines completed in Activity Three as well as Mrs Cooper's 'Activity Ideas' (<https://mskhealthresearch.com/osteoporosis-lesson-3>), complete the table below.

You will need to identify and outline the following:

- what types of physical activities could be completed to meet the guidelines,
- what kind of physical responses the body would have to each of the activities,
- how the guidelines could be incorporated into a Year 7 or Year 8 students week.

Physical Activity Guideline	Activities to meet guideline Eg: running.	Physical responses of the body to activity. Eg: improved cardiovascular endurance.

ACTIVITY 5 (extension)

Using the research of recommended physical activity guidelines, combined with the information about the importance of exercise for reducing Osteoporosis in the website provided, create an infographic showing five activities and exercises best suited for building healthy bones in kids. The infographic must include a catch phrase, outline the five different activities and be aimed at kids your age. If you're stuck for ideas, use the Sport Australia website below as a starting point.

Brainstorming and planning space for Activity Five:

<https://healthybonesaustralia.org.au/your-bone-health/exercise-bone-health/>

<https://www.sportaus.gov.au>

Complete the online quiz with Mrs Cooper at the end of the lesson to demonstrate your learning!(<https://mskhealthresearch.com/osteoporosis-lesson-3>)

Once you have completed Lesson 3 please complete this short survey

<https://redcap.sydney.edu.au/surveys/?s=4KDLPXAENX9KDMCE>



LESSON THREE

ACTIVITY ONE: RESPONSES

- The extent of an individual's continuing physical, emotional, mental, and social ability to cope with his or her environment.
- Combination of a range of dimensions including: physical, emotional, spiritual, intellectual, environmental and social that impact an individual's overall wellbeing.
- Holistic view of individuals wellbeing, recognising that to be healthy, you can't simply focus on one aspect of an individuals life. Rather, it is vital that there is a positive combination of all components such as physical, emotional, mental.

ACTIVITY TWO: RESPONSES

- Good physical health: exercises often, eats a well balanced diet, sleeps well, no smoking and limited alcohol consumption, lack of sickness, lack of injuries.
- Poor physical health: doesn't exercise often, doesn't have a balanced diet, poor sleep, often sick, often injured.

ACTIVITY THREE: ANSWERS

Health Dimension	Guideline
Physical Activity	Accumulating 60 minutes or more of moderate to vigorous physical activity per day involving mainly aerobic activities. Activities that are vigorous, as well as those that strengthen muscle and bone should be incorporated at least 3 days per week. Several hours of a variety of light physical activities should also be incorporated.
Screen time	Limiting sedentary recreational screen time to no more than 2 hours per day.
Sedentary activities	Breaking up long periods of sitting as often as possible.
Sleep	An uninterrupted 9 to 11 hours of sleep per night for those aged 5–13 years and 8 to 10 hours per night for those aged 14–17 years and consistent bed and wake-up times.

LESSON THREE

ACTIVITY FOUR: RESPONSES

Guideline	Activities to meet guideline Eg: running.	Physical responses of the body to activity. Eg: improved cardiovascular endurance.
60min moderate to vigorous activity, involving mainly aerobic.	Running, cycling, zumba.	Improve cardiovascular endurance.
Activities that strengthen muscles and bones 3 days/week.	Weights sessions, pilates.	Improved bone strength, stability and muscular endurance.

ACTIVITY FIVE: IDEAS

LEVELIGHTER

FACTS ABOUT PHYSICAL ACTIVITY

1 IN 2
Australians do enough moderate or vigorous intensity physical activity for good health.

MOVEMENT IS THE BEST MEDICINE
Being active reduces your risk of heart disease, some cancers and type 2 diabetes. It also strengthens your muscles and bones, helps to maintain body weight and can reduce symptoms of depression.

For good health, each week aim for:
2h30min-5h of moderate physical activity, or 1h15min-2h30min of vigorous physical activity.
OR an equivalent combination of both.
The more intense your activity, the greater the benefit!

SIT LESS 44%
of Australian adults spend most of their day sitting.
Even if you meet physical activity guidelines, you should aim to break up long periods of sitting – as often as possible!

2 DAYS EACH WEEK
To stay healthy, do strength exercises on at least 2 days each week.
Call raises, squats, push-ups, yoga, pilates and weights all count.

SOME IS BETTER THAN NONE, AND MORE IS BETTER THAN LESS!

GET MOVING AFTER MEALS
Doing light-to-moderate activity like walking after you eat improves blood sugar control.

WATCHING OVER 5 HOURS OF TV EACH DAY
Is linked to weight gain and higher body fat, even if you are doing moderate exercise.

GET ON THE HEALTH TRAIN
Using public transport can boost your physical activity level by around 12 to 15 minutes per day, which is almost half way to meeting the minimum level recommended for good health!
For more information, visit www.levelighter.com.au

BOUNCE, PASS AND THROW!
People who participate in sports and organised recreational activities enjoy better mental health, are more alert, and less stressed.

Physical activity for children and young people (5 – 18 Years)

BUILDS CONFIDENCE & SOCIAL SKILLS

DEVELOPS CO-ORDINATION

IMPROVES CONCENTRATION & LEARNING

MAINTAINS HEALTHY WEIGHT

STRENGTHENS MUSCLES & BONES

IMPROVES HEALTH & FITNESS

IMPROVES SLEEP

MAKES YOU FEEL GOOD

Be physically active

Spread activity throughout the day

All activities should make you breathe faster & feel warmer

PLAY

RUN/WALK

BIKE

ACTIVE TRAVEL

SWIM

SKATE

SPORT

PE

SKIP

CLIMB

WORKOUT

DANCE

Include muscle and bone strengthening activities 3 TIMES PER WEEK

Sit less

LOUNGING

Move more

Find ways to help all children and young people accumulate at least 60 minutes of physical activity everyday

UK Chief Medical Officers' Guidelines 2011 Start Active, Stay Active: www.bit.ly/startactive

5-17 year olds should get at least 60 MINUTES OF MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY EVERYDAY!

95%

of Canadian Kids DON'T GET ENOUGH PHYSICAL ACTIVITY.

Encourage kids to:

RUN

WALK

SWIM

PLAY

BIKE

Source: Active Healthy Kids Canada (2013), Are We Driving our Kids to Unhealthy Habits?

PARTICIPACTION

Let's get moving.

participACTION.com

LESSON FOUR

ACTIVITY ONE (core)

1(a) Discuss and identify on the post-it notes below what is needed to supplement a child's health, in addition to components outlined in Lesson Three (physical activity, restricted sedentary time, sleep and reduced screentime), to ensure bones are healthy. e.g good diet

A large yellow rectangular sticky note intended for students to write their responses to question 1(a).

A large yellow rectangular sticky note intended for students to write their responses to question 1(a).

1(b) Using your answers above and Mrs Cooper's 'Cool Fact' (<https://mskhealthresearch.com/osteoporosis-lesson-4>), research what community or school programs exist in Australia to encourage and support these choices, record these below.

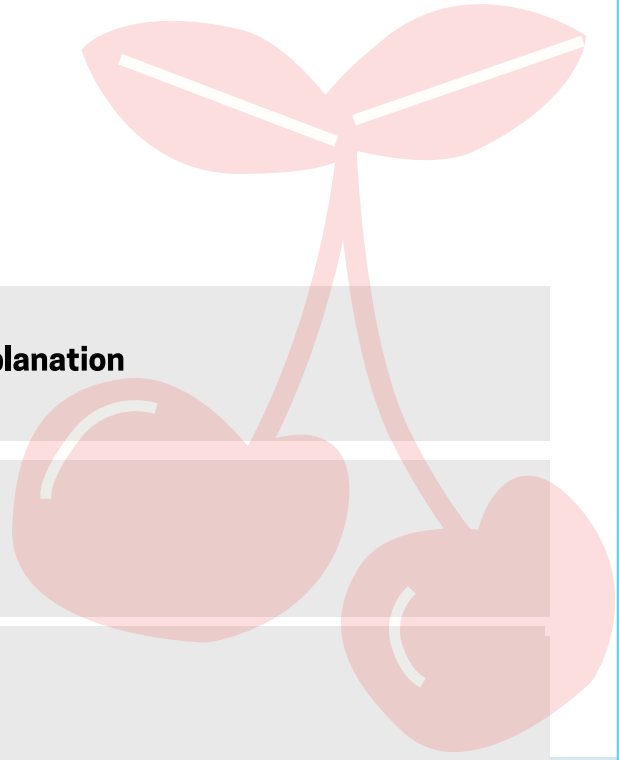
A large light blue rectangular area intended for students to record their research findings for question 1(b).

ACTIVITY TWO (core)

Using the Australian Dietary Guidelines (<https://www.eatforhealth.gov.au/guidelines/about-australian-dietary-guidelines>) and Mrs Cooper's 'Australian Dietary Guidelines' information (<https://mskhealthresearch.com/osteoporosis-lesson-4>), identify the five Australian dietary guidelines and record responses in the table on the next page.



LESSON FOUR



ACTIVITY TWO CONT.

Guideline	Australian Dietary Guideline explanation
Guideline 1	
Guideline 2	
Guideline 3	
Guideline 4	
Guideline 5	

ACTIVITY THREE (core) 3(a) Using the website below as well as Mrs Cooper's 'Calcium and Bones' slide (<https://mskhealthresearch.com/osteoporosis-lesson-4>), research how a person's calcium intake impacts their healthy bones, recording the answers below:

3(b) Research what food groups are most important for growing healthy bones, recording your answers below:



<https://healthybonesaustralia.org.au/your-bone-health/calcium/>

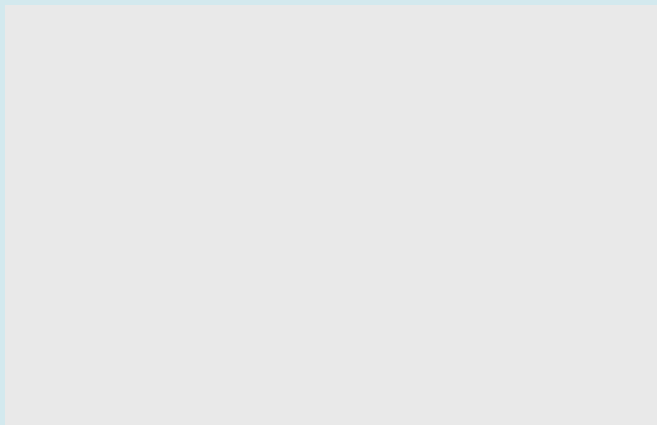
LESSON FOUR

ACTIVITY FOUR (core)

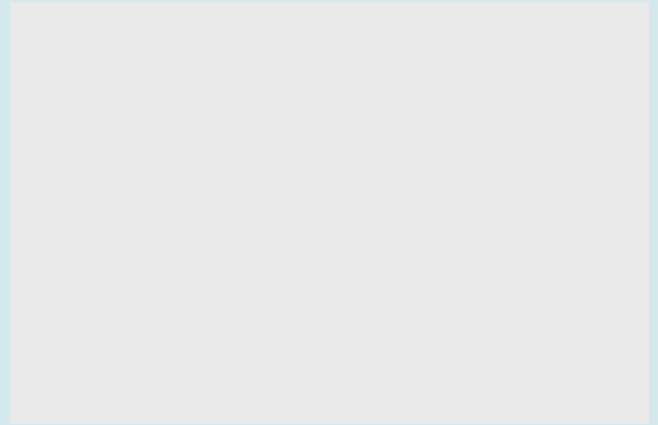
Draw what breakfast and dinner plates should look like for kids and create an example lunchbox, justifying the inclusions in relation to foods for building healthy bones, using the Australian Guide to Healthy Eating diagram (<https://www.eatforhealth.gov.au/guidelines/australian-guide-healthy-eating>) and Mrs Cooper's 'Making Healthy Choices' (<https://mskhealthresearch.com/osteoporosis-lesson-4>) for assistance.



DINNER PLATE

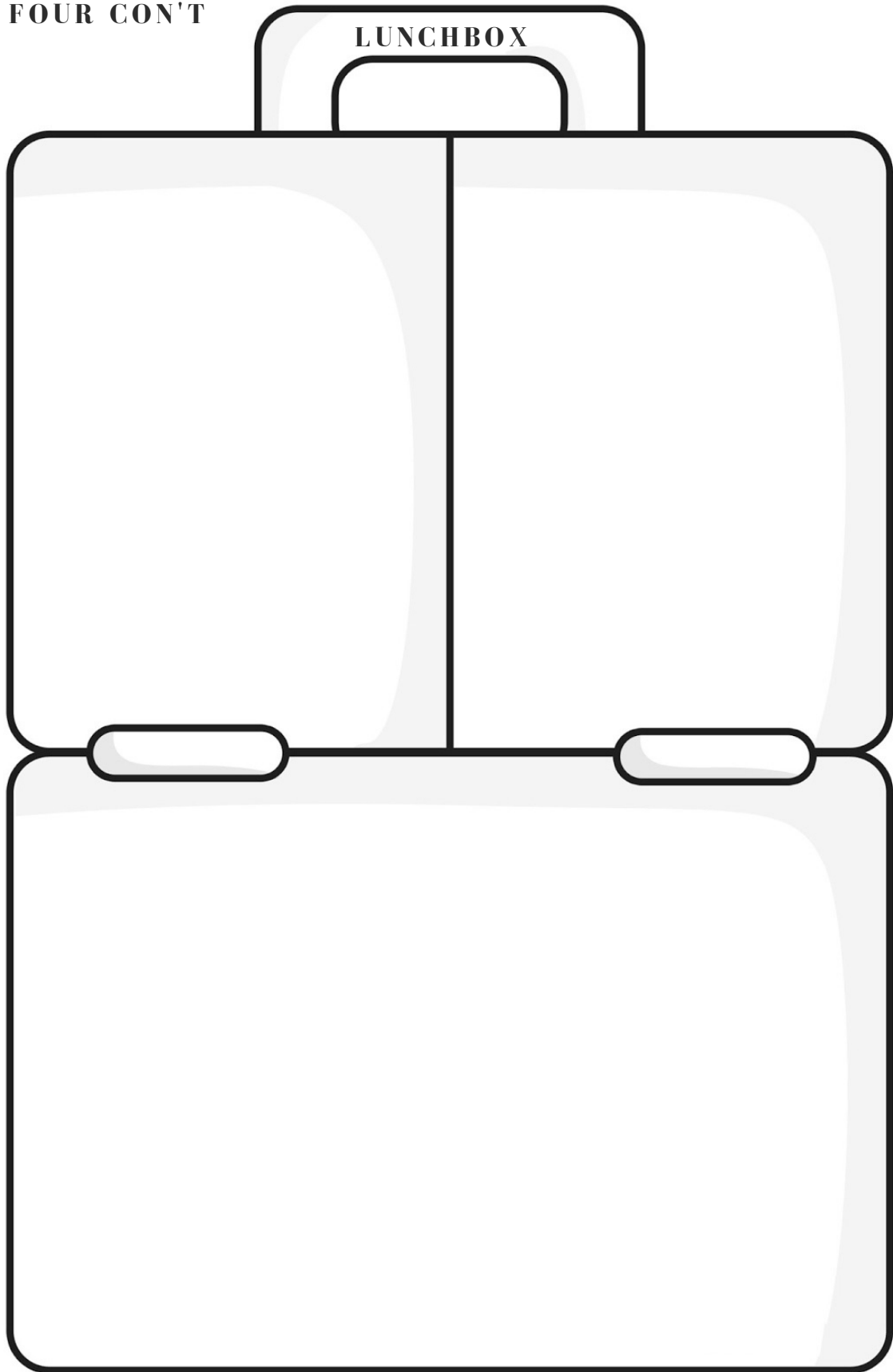


BREAKFAST PLATE



**LESSON
FOUR**

ACTIVITY FOUR CON'T



LESSON FOUR

ACTIVITY FIVE (extension)

In small groups, create a new diet focused community initiative and develop a radio advertisement or brochure to advertise it, expressing the importance of diet in building healthy bones and its link to prevention of Osteoporosis across the lifespan of a person.

Include the following:

- A slogan for the community initiative
- What types of foods are required to build healthy bones
- How much of each food is required to build healthy bones
- How each food is linked to building healthy bones

For the brochure, suggestions for creation include Canva, Adobe Sparke, Microsoft Publisher or any other accessible publishing resources. For the radio advertisement, an easy online voice recorder website is below (<https://online-voice-recorder.com/>).

Slogan ideas

Types of food required to build healthy bones?

How much of each food?

How each food is linked to healthy bones?

Don't forget to complete your end of lesson quiz with Mrs Cooper!
(<https://mskhealthresearch.com/osteoporosis-lesson-4>)



Once you have completed Lesson 4 please complete this short survey <https://redcap.sydney.edu.au/surveys/?s=9KKJNHW9XKJJRHDD>

LESSON FOUR

ACTIVITY ONE RESPONSE EXAMPLES

Diet:

- Healthy Harold: <https://www.lifeeducation.org.au/about-us/healthy-harold>
- 2&5: https://healthywa.wa.gov.au/Articles/F_I/Go-for-2-and-5
- Crunch and Sip: <https://www.crunchandsip.com.au/>

Vitamin D:

- PDHPE classes outside
- Access to health services
- Clean water accessibility
- Good hygiene

ACTIVITY TWO ANSWERS

Guideline 1: To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs.

Guideline 2: Enjoy a wide variety of nutritious foods from these five groups every day.

Guideline 3: Limit intake of foods containing saturated fat, added salt, added sugars and alcohol.

Guideline 4: Encourage, support and promote breastfeeding.

Guideline 5: Care for your food; prepare and store it safely.

ACTIVITY THREE RESPONSES

- Calcium is essential for building and maintaining bone. Almost 99% of the body's calcium is found in the bones.
- Calcium combines with other minerals to form hard crystals that give your bones strength and structure.
- Bones act like a calcium bank, if you do not take in enough calcium from your diet, the body will withdraw calcium from your 'bone bank' for use in other parts of the body.
- If your body withdraws more calcium than it deposits, your bone density (bone strength) will gradually decline and you may be at risk of developing osteoporosis.

Most important foods:

Dairy foods, canned salmon or sardines, soy based products and tofu that contain calcium, broccoli, Bok Choy, silverbeet, cucumber, celery and chick peas, almonds, dried figs and dried apricots.

LESSON FOUR

ACTIVITY FOUR ANSWERS

Healthy Eating Recommendations:

- Plenty of vegetables, including different types and colours, and legumes/beans
- Fruit
- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of 2 years)
- And drink plenty of water.

