

Lesson plan

Are turtles slow? Exploring the forces affecting turtle movement.

Lesson time: 60 minutes	Target year level: 4
Learning intentions	Curriculum links
<ul style="list-style-type: none"> Recall that a push or pull force moves objects. Recall that forces are either contact (direct) or non-contact (indirect). Describe the movement of objects as being fast or slow. Explain how the speed of objects (such as a turtle) is affected by force. 	<p>Forces can be exerted by one object on another through direct contact or from a distance.</p> <p>With guidance, identify questions in familiar contexts that can be investigated scientifically and make predictions based on prior knowledge.</p> <p>Science involves making predictions and describing patterns and relationships.</p> <p>Science knowledge helps people to understand the effect of their actions.</p>
Learning resources	Other equipment required/notes
<ul style="list-style-type: none"> 'Forces Bingo Cards' – 1 per pair 'Forces STW Worksheet' (or 'Simple Worksheet' for lower ability) – 1 per student 'Forces CEC Worksheet' – 1 per small group 'Forces PPT' which includes 'STW Forces' video (2 min), 'Nesting Sequence' video (1 min), 'Code of Conduct' 	<ul style="list-style-type: none">

Lesson overview and background

This lesson is structured using **Visible Thinking Strategies**, such as “See, Think, Wonder” and “Connect, Extend, Challenge” as they explore the topic with the support of videos. Prior learning about forces is assumed, this would be most suitable for mid or end of a program.

Students explore the movement of turtles in the ocean and on land comparing how push, pull, direct and indirect forces act on turtles and influence their speed and motion.

Learning activities and strategies

Phase Timing	Suggested activity and strategies	Resources or equipment
Engage (15 min)	<p>Forces prior understanding</p> <p><i>Hand out 'Forces BINGO card' to pairs of students. Instruct them to listen for the bingo words during the lesson and cross them off. The first three people to identify four words in a row will win!</i></p> <ul style="list-style-type: none"> Hook: Either “Tug of War” activity or “Palms Together” activity (students stand up with both palms against their partners, push to see if they can be balanced, then who can push the others to just before their nose). <ul style="list-style-type: none"> What was happening when your palms or the rope was balanced? What was happening when one side “won”? Review terminology on board: Force, Push and Pull, Contact or Direct force <p><i>Teacher Note:</i> A force can be described as a push or a pull. Pushes and pulls can be seen to act on objects when they begin to move, speed up, slow down or change direction. A direct or contact force occurs when two objects are contacting each other.</p>	<ul style="list-style-type: none"> 'Forces PPT' (slides 1 – 10) 'Forces Bingo Card'

	<ul style="list-style-type: none"> ● Ask students to rub their palms together. <ul style="list-style-type: none"> ○ What do they observe? ○ What force is this? <p><i>Teacher Note: Friction</i> is a contact force that results from one object “resisting” the push or pull of the other. The rougher the surface, the more energy is needed to push or pull, which is converted into heat. Add to board notes.</p> ● Ask students to hold their hands up so they are about 10cm from their partners’. <ul style="list-style-type: none"> ○ Can they push each others’ hands now? ○ Is there still force? ● Ask students to jump on the spot. <ul style="list-style-type: none"> ○ What happens when you jump? (you come back down) ○ Was there anything pushing you back down? No, so what caused it? (gravity – a non-contact force) ○ What happens if you jump in the pool or the ocean? (float or fall slower; buoyancy) ● Review terminology on board: Indirect or non-contact force <p><i>Teacher Note:</i> A non-contact or indirect force is when a force exists without objects touching, due to other attraction or repulsion (could give demonstration of magnets here). Examples include gravity (pulls down) or buoyancy (pushes up).</p> 	
<p>STW (15 min)</p>	<p>See, Think, Wonder – Turtles in water <i>Hand out Forces ‘STW Worksheet’ (Use ‘Simple’ version for lower ability) to each student.</i></p> <ul style="list-style-type: none"> ● Hook: Turtles are known for being “slow” animals. But are turtles actually slow, or is it the effect of forces? ● Play ‘STW Forces’ video – stop at 0:37. Replay this section and allow time for students to write what they “see, think, wonder” about turtles swimming in the ocean. ● Facilitate class discussion: <ul style="list-style-type: none"> ○ What did you see? ○ What direct and indirect forces were present? ○ How did you know? ○ Does a turtle move fast or slow in the water? ○ What do we still want to know about how turtles move in water? ○ How could we find this out? 	<ul style="list-style-type: none"> ● ‘Forces’ PPT (slides 11 – 12) ● ‘STW Worksheet’ ● ‘STW Forces’ video
<p>STW (15 min)</p>	<p>See, Think, Wonder – Turtles on Land</p> <ul style="list-style-type: none"> ● Play ‘STW Forces’ video – from 0:38 to end. Replay this section and allow time for students to write what they “see, think, wonder” about turtles moving on land. ● Facilitate class discussion: <ul style="list-style-type: none"> ○ What did you see? ○ What direct and indirect forces were present? ○ How did you know? ○ Does a turtle move fast on land? 	<ul style="list-style-type: none"> ● ‘Forces’ PPT (slide 12) ● ‘STW Forces’ video

	<ul style="list-style-type: none"> ○ How does their movement on land compare to their movement in the water? ○ What do we still want to know about how turtles move on land? ○ How could we find this out? 	
<p>CEC (12 min)</p>	<p>Connect, Extend, Challenge (optional extension) <i>Hand out 'Forces CEC Worksheet' to groups of students, or conduct less formal "Think, Pair, Share" activity.</i></p> <ul style="list-style-type: none"> ● Play 'Nesting Sequence' video – from start to end. Instruct students to just watch. ● Replay the video and allow time (6 min) for students to complete the Connect, Extend, Challenge worksheet as a group. This should be focused on the forces they observed that are used during nesting. ● Groups share their thoughts with the class using a random questioning technique. 	<ul style="list-style-type: none"> ● 'Forces' PPT ● (slides 13 – 14) ● 'Forces CEC Worksheet'
<p>Reflect (3 min)</p>	<p>Turtle Code of Conduct</p> <ul style="list-style-type: none"> ● Ask the class to consider: <ul style="list-style-type: none"> ○ When are turtles most vulnerable to predators and humans? (on land they are slower – they don't like to be exposed on land for too long, so will leave their nest if they feel threatened or abandon a nesting attempt) ● Show the "Code of Conduct" on screen - point out these rules are because turtles need to feel safe on land. 	<ul style="list-style-type: none"> ● 'Forces PPT' (slides 15 – 16) ● 'Code of Conduct'