

Mass

<p>Outcomes</p> <p>Early Stage 1</p> <ul style="list-style-type: none"> › describes mathematical situations using everyday language, actions, materials and informal recordings MAe-1WM › uses concrete materials and/or pictorial representations to support conclusions MAe-3WM › describes and compares the masses of objects using everyday language MAe-12MG 	<p>Language</p> <p>mass, matter, heavy, heavier, heaviest, light, lighter, lightest, about the same as, hard to push, hard to pull, hefting</p>
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Syllabus pp57 & 58

In Early Stage 1, students develop an awareness of the attribute of mass and some of the language used to describe mass. Opportunities to explore mass concepts and understand the action of a two-pan balance occur in play situations, such as a seesaw in a children's playground. Students in Early Stage 1 should only be comparing two objects that are quite different in mass. Early experiences often lead students to the conclusion that large things are heavier than small things and that if two things are the same size and shape, then they will have the same mass. To develop beyond this, students need to have experiences with objects that are light and large, heavy and large, light and small, heavy and small, and large but lighter than a smaller object.

When students are asked to compare the masses of two objects of equal mass and can consistently say that the objects are equal in mass though their shapes are different, they are *conserving* mass. Aboriginal communities were traditionally able to determine whether ducklings would be male or female by hefting duck eggs (female eggs are heavier), as well as by considering other factors such as size, shape and temperature.

Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date
<p>Being an equal arm balance</p> <p>Students stand with their arms outstretched to simulate equal-arm balances. Teacher holds an object in each hand and asks students to predict and demonstrate what would happen to their arms if the objects were placed in their hands. The teacher places the objects in a student's hands to test the predictions. (p. 126 <i>Teaching Measurement ES1 and S1</i>)</p>		
<p>Blindfold</p> <p>Students take turns to be blindfolded. Teacher or another student places an object or</p>		

<p>container in each hand of the blindfolded student. Objects should be obviously light or obviously heavy objects, e.g. piece of string, paperclip, large stone, large bottle of liquid. Students state which hand is holding the heavier object or container. Students watching make a visual estimate of which is the heavier object.</p>		
<p>Can I Pull it? Given three large objects on the floor, students estimate which is heaviest or lightest. Check the masses by tying a cord around each object and trying to pull it across the floor.</p>		
<p>Guessing Game In pairs, students are given an ice-cream container and a collection of objects, each of different mass e.g. ping-pong ball, lump of plasticine and chalkboard duster. Student A selects one of the objects and places it in the ice cream container, and puts the lid on without the other students seeing which object has been chosen. By handling the container, and without referring to the original group of objects, Student B is asked to determine which object has been placed in the container. Students should be encouraged to ask each other why they think a particular object is in the container.</p>		
<p>Heavier than or lighter than? Refer to lesson plan for more details Students are given three or four small items. (Different objects or different numbers of the same object). Students estimate and then order the objects by hefting. Record and discuss.</p> <p><i>Extension:</i> Check by dropping each item or group of items into suspended, knee-high stockings or long socks.</p>		
<p>Heavy Bag, Light Bag? Take turns to decide if your bag is heavier, lighter or the same as the teacher's. (The teacher's bag should be lighter, heavier or about the same mass as students' bags.)</p>		
<p>Hefting Heft masses and describe which is heavier and which is lighter (when the mass is not</p>		

related to the size of the packaging, e.g. feather, tennis balls, books.)

Twin bags

Find a partner who has a bag with about the same mass as your bag. Students are each given a bag containing a mass. Teacher prepares the bags or invites students to fill the bags, given a choice of objects and materials.



Open-ended Questions

What can you find that is lighter than a pen? (book,ball...)etc?
What can you find that is heavy but small?

Two groups

Sort heavy and light objects into two groups. Objects should be obviously light or obviously heavy, e.g. piece of string, paperclip, large stone, large bottle of liquid. Students report back on why objects were placed into different groups. Brainstorm heavy and light objects (What couldn't you lift?)

<p>Using an equal arm balance Teach children how to use an equal-arm balance. This could include adding no more masses when it is just balanced, and discussing the idea of fractional masses, e.g. it is heavier than two blocks but lighter than three blocks so its mass must be between two and three blocks. It might be two and a half blocks.</p>		
<p>What Do You Think? Prediction game. Each child in a group has four objects. Students predict whether their four objects are heavier, lighter, or about the same as another student's four objects. (feather, shoes, hats, cotton balls, leaves).</p>		
<p>Your Turn To Choose Pairs of students select three items from a collection. Students estimate, then place the items in order of mass by hefting. Record the order. Students should be able to explain in pairs how the items were compared.</p>		
<p><u>Using Technology to Teach Mathematics</u> Mathletics</p> <ul style="list-style-type: none"> • Everyday mass • Balancing act 		
<p><u>Story Books</u></p> <ul style="list-style-type: none"> - Who Sank the Boat? By Pamela Allen - Mr Archimede's Bath By Pamela Allen - Big and small by Jim Pipe 		
<p>Other Activities</p>		

