



Spear throwing

This unit of six lessons is planned to allow Aboriginal students to make connections with their cultural understanding of spear throwing, and for non-Aboriginal students to learn something about Aboriginal culture, linking it to mathematics learning.

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CURRICULUM INFORMATION

PHASE OF DEVELOPMENT

Early childhood	✓
Middle childhood	✓
Early adolescence	✓
Late adolescence	

MAJOR LEARNING AREAS

The Arts	
English	✓
Health & Physical Education	✓
Languages	✓
Mathematics	
Science	✓
Society & Environment	✓
Technology & Enterprise	✓

VALUES

Pursuit of knowledge ... achievement of potential	✓
Self acceptance and respect of self	✓
Respect and concern for others and their rights	✓
Social and civic responsibility	✓
Environmental responsibility	

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TOPIC INFORMATION

PURPOSE

- To provide an opportunity for students to integrate their culture into their mathematical learning.
- To make students aware that maths concepts are a part of everyday Aboriginal activities, both past and present.
- To have students investigate ways to measure the distance a spear will travel when thrown.
- To provide an opportunity for students to understand that an appropriate uniform unit must be chosen for comparing measurements of the distance spears travelled.

STUDENT OUTCOMES

The student:

- uses non-standard units to measure the distance travelled by a spear;
- chooses appropriate items to use as units of measurement ensuring the unit relates to what is being measured;
- finds a 'true' measurement by ensuring there are no gaps and overlaps;
- uses uniform units and measures accurately to compare lengths;
- uses tables to record results; and
- records data from tables on graphs.

KEY BACKGROUND POINTS

- The concept of length is one which teachers often assume children understand, particularly when they use words such 'kilometres' or 'ks' in appropriate ways in their conversation. Many children from Western cultures are immersed in this language even prior to formal schooling.
- Aboriginal cultures are less concerned with quantity and accuracy so Aboriginal children are unlikely to bring similar understandings to a classroom situation. In these cultures, measures of distance are often referred to in general terms, such as 'not far' or 'a little way' rather than in specific distances.
- In some Aboriginal cultural groups, direction is more important than distance. For example, an Aboriginal person might point in a particular direction and say 'close up' (meaning not far that way) or 'long way'. The time it takes to say the word 'long' may indicate the distance.

- Similarly, length is frequently more about individual or personal length, rather than a measurement in generic units. When making a spear for example, the length of the arm of the person using the spear may be used as a reference – an appropriate unit for this purpose.
- All children should be presented with this view of measurement.

(From Thelma Perso, *Improving Aboriginal Numeracy*).

- While some students may immediately select an appropriate unit for measuring different distances, and line up these units end to end, along the distance to be measured, many will choose different sized objects (unit) to measure different distances. This lesson draws on First Steps in Maths: Measurement – understand units/direct measure, to help clarify the concept of using a uniform unit of measurement for comparison of distances.
- Students need to understand that 'summarise' and 'represent', when referring to data, have the following meanings:
 - summarise: a brief but comprehensive way of showing the data
 - represent: showing data in a way that is easy to understand
- Graphing is a means of showing, or representing, data.
- We should question the need to teach students how to draw graphs by hand in the technological world we live in. Use your professional judgement about whether to use a computer program such as Excel, other charts, or draw bar graphs. The main idea is for students to construct graphs in some way, interpret and explain what they show.

CULTURAL & PROTOCOL CONSIDERATIONS

- In our school, East Kalgoorlie Primary School, girls were not to participate in this activity as in their culture they were not allowed to throw spears. Men used spears for hunting and this is not part of the women's role. Check with your local community to see rules for girls' participation.
- If you live on the coast, girls may be able to participate using fishing lines instead of spears. If spears are not available, boomerangs may be substituted.



RESOURCES

MEDIUM	AUTHOR, PRODUCER, DEVELOPER, ETC	TITLE	SOURCE
book	Thelma Perso	<i>Improving Aboriginal Numeracy</i>	MASTEC (Aust.) 2003, Available from the Mathematical Association of Western Australia
book	Department of Education and Training, WA, & Rigby Harcourt Education	<i>First Steps in Maths – Measurement and Chance and Data</i>	Educational bookshops

TEACHING AND LEARNING STRATEGIES

TEACHING RESOURCES

Overview for all lessons – particular resources required for individual lessons are listed with their lesson outline.

- digital camera to capture the experience
- spears, woomeras (available from Aboriginal community or students can bring spears from home)
- oval – or similar space, marked clearly to show the place to throw spears from, each time.
- an Aboriginal Elder from the community – AIEO to assist in organisation
- measuring box – fill a box with different ‘units’ for students to choose from: eg paperclips, pens, pipe cleaners, streamers, counters, unifix cubes, marbles, toothpicks, cotton wool ...
- collection of tape measures, trundle wheels, metre rulers, metre lengths of string/wool ...
- students own metre rulers made using different materials
- KWL chart
- easel for learning table
- thick marker pens

- graph paper
- examples of different types of graphs
- matchsticks
- computers to link to IT (to make graphs using Excel if you so choose)
- **LEARNING GUIDE 1: record of distance travelled by spear**
- **LEARNING GUIDE 2: compare your throw with a friend’s**
- **LEARNING GUIDE 3: record of distance travelled by spear (standard units)**
- **LEARNING GUIDE 4: diagnostic task – spear throwing**
- **RECORDING SHEET: diagnostic task – spear throwing**

Adapt lessons as required to suit the needs/levels of your students.



Lesson 1: Prior knowledge and cultural considerations - Elder visit

TEACHING RESOURCES

- digital camera to capture the experience
- spears, woomeras (available from Aboriginal community or students can bring spears from home)
- oval – or similar space, marked clearly to show the place to throw spears from, each time
- KWL chart
- Aboriginal Elder from the community – AIEO to assist in organisation

Preparation

- **Consult** Aboriginal experts, AIEOs and others from school and community to find correct protocols for spear throwing, and to identify who could come to demonstrate and explain these to your class.
- **Consult** AIEOs and seek their assistance in organising an appropriate Aboriginal person/Elder to come to school and demonstrate spear throwing skills.
- **Invite** Elder to talk to your class and discuss what you'd like them to do. In this case you want them to share their knowledge about: throwing a spear; using a woomera; discussing how far a spear must be thrown;

and Aboriginal languages associated with spears and hunting. Depending on how the Elder shares cultural knowledge with students, be aware it may look different from your expectations. Ask if the Elder is happy for students to ask questions at the end of the session.

- **Book** AIEO support time and arrange for community helpers (as appropriate) so that you have one adult per group for the spear throwing activity.
- **Organise** someone – it may be students – to photograph activities and students as they participate.
- **Prepare** students for the visit. Make clear your expectations about demonstrating respect to the Elder, for both Aboriginal and non-Aboriginal students.
- **Prepare** a greeting for the Aboriginal Elder, on arrival for the visit to the class.
- **Thank** the visitor for sharing their culture with students, or ask a student to prepare beforehand to do this on behalf of the class.
- **Prepare** a KWL outline for developing a class chart (see below, with sample entries after class discussion).
- **Prepare** list of focus questions for group discussing ways to measure distance thrown.

WHAT I ALREADY KNOW ABOUT SPEARS	WHAT I WANT TO LEARN ABOUT SPEARS	WHAT I LEARNT ABOUT SPEARS
Aboriginal people used them for hunting. Girls can't throw them. Spears were made from special trees called _____. *A woomera makes a spear go further.	Do Aboriginal people still hunt with spears? How do you make a spear? *Who will throw the greatest distance? Who teaches you how to make spears? What is a spear called in Aboriginal language?	Entries may be added to this part at the end of each lesson.

* These points relate to mathematical understandings.

Implementation

Whole class

Before the Aboriginal Elder arrives:

- **Discuss** what students know about spear throwing and what they'd like to know. These points may be questions for students to ask the visiting Elder at the end of the lesson, if they still need to.
- **Enter** points raised on KWL chart.
- **Teach** students how to show respect to Aboriginal Elders: listen when they are talking; watch when demonstrating; and repeat language when requested. This often means, I say it then you say it.
- **Discuss** safety rules of spear throwing. Ensure

everyone understands safety issues involved. For example, do not run out to collect a spear until everyone has completed their throw; no throwing spears at each other; only throw when instructed to do so from the point marked for this purpose ...

- **Move** students outside onto the oval area to greet the Elder.

When the Aboriginal Elder arrives:

- **Greet** Elder – you may have arranged for a student to prepare to do this.
- Aboriginal Elder **teaches** students about spear throwing using cultural protocols.
- Aboriginal Elder **demonstrates** how to throw a spear both with and without a woomera.



Working in small groups

Divide class into groups – 8 is ideal for this activity.

Groups will rotate through each of the following tasks:

- **practising** the art of throwing a spear under Elder's guidance,
- **observing and discussing** techniques being used by group with Elder; and
- **responding** to prepared focus questions like:
 - How could we measure the distance the spear travelled?
 - What should we use to measure how far it went, keeping in mind, we have no measuring equipment?
 - What would be appropriate? Now? If we could get some equipment?
 - Could we use different ways of measuring different throws? Why? Why not?

Whole Class

When each group has completed the above activities they may:

- **Discuss** students' queries with Elder (prior to lesson ensure Elder is happy to do this).
- **Thank Elder** for their visit (as prepared).

Return to class

- **Include** additional learning on the KWL chart.

ASSESSMENT

Teacher observation. Focus questions may include aspects like:

- Did students demonstrate respect for Aboriginal culture and the Aboriginal Elder, and value the learning experience?
- How well did each student participate in each activity: spear throwing; observation; measurement discussion?
- Did student implement the advice provided by the Elder?

Lesson 2: Measuring using non-standard units

TEACHING RESOURCES

- digital camera to capture the experience
- spears, woomeras (available from Aboriginal community or students can bring spears from home)
- oval – or similar space, marked clearly to show the place to throw spears from, each time
- measuring box – fill a box with different ‘units’ for students to choose from: eg paperclips, pens, pipe cleaners, streamers, counters, unifix cubes, marbles, toothpicks, cotton wool ...
- large copy of **LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)** for recording data (tally table)
- easel for learning table
- thick marker pens
- individual copies of **LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)** for each student to record results and their reflection response

Preparation

- Collect a variety of equipment to make a measuring box.
- Book AIEO support time and arrange for community helpers (as appropriate) so that you have one adult per group for the spear throwing activity.
- Plan lesson in conjunction with AIEO and maths specialist staff where appropriate.
- Photocopy **LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)** for each student to record results and their reflection response.
- Prepare a chart-size class copy of the first section of **LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)** to use as a tally table on an easel outside. Sample partially completed chart follows:

NAME	ESTIMATION OF BEST THROW	THROW ONE	THROW TWO	THROW THREE	CHOSEN UNIT OF MEASURE
Bob	60 footsteps	74 footsteps	80 footsteps	70 footsteps	footsteps
Dick					body lengths
Harry					a stick
Peter	100 strides	18 strides	22 strides	40 strides	strides

Implementation

In classroom, prior to moving to the oval:

Whole class

- **Discuss** measurement – **focus questions:** What do we want to measure? What shall we use?
- **Practise** selecting appropriate units from the measuring box to measure different things in the classroom – **focus questions:** What shall we use? How will we do it? Of all the things you tried to measure with, which was best? Why? Could you measure how high or how far you could throw something?
- **Discuss** the need for no overlapping or gaps between units when measuring, and how overlapping and gaps change measurement results.

- **Group** students (4 to 6 per group) according to understanding demonstrated in discussions and in Lesson 1, for example, group together students who left gaps, or overlapped ...
- **Revise** safety rules from Lesson 1.
- **Move** students out onto the oval.

Working in groups

- **Select** a unit (each student) to measure their throws.
- **Estimate** (each student), using chosen unit as a measure, how far their best throw will travel.
- **Revise** spear throwing techniques, and **discuss** how to improve the distance they can throw.
- **Reach** a consensus through voting on: Do we use a woomera to help us throw? (yes/no)



When happy with their images, students:

- **Throw** spear and **measure** throw using chosen unit.
- **Report** and record first throw on class tally table.
- **Repeat** process for subsequent throws (number of throws each will depend on number in groups).
- **Return** to classroom with class data.

Whole class

- **Distribute** student copies of **LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)**.
- **Transfer** data onto individual record sheets.

- **Complete** maths journal reflection about comparing results to determine who threw the furthest.
- **Write** about any problems encountered.

ASSESSMENT

- Students complete **LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)**.
- Were students able to explain in their maths journal reflection why comparison of results was not valid?

Lesson 3: Measuring and comparing using uniform units

TEACHING RESOURCES

- digital camera to capture the experience
- spears, woomeras (available from Aboriginal community or students can bring spears from home)
- oval – or similar space, marked clearly to show the place to throw spears from, each time
- student copies of **LEARNING GUIDE 2: compare your throw with a friend's**

Preparation

- **Understand** how your students learn. Questions about abstract concepts are difficult for Aboriginal children to answer, they often respond with 'just because'. They may understand a concept but be unable to express their knowledge verbally. You need to provide scaffolding to assist responses.
- **Book** AIEO support time and arrange for community helpers (as appropriate) so that you have one adult per group for the spear throwing activity.

Implementation

In classroom prior to moving to the oval

Whole class

- **Discuss** reflective journal responses from previous lesson, allowing students the opportunity to discuss and clarify their understandings. If students are unable to articulate understandings, you may need to help clarify what they mean, and model how they could frame their answers. For example, my feet are bigger than your feet, so, if we measure the distance the spear travelled using my big feet will we get the same answer as you using your little feet?
- **Organise** students to work in pairs.
- **Ask** each pair to take with them a notebook and pencil to write down distances they throw the spear.
- **Move** students out onto the oval.

Working in pairs

Model the following process with one pair of students.

- Student 1 (S1) **throws** spear and measures their throw using a stick (longer than their foot).
- Student 2 (S2) **throws** spear and measures their throw using same stick.
- **Record** their results, for example: S1 throw = 15 sticks; S2 throw = 23 sticks.
- **Ask** students: Who threw further? How much further? How do we know?
- **Ask** students to measure the shorter distance (15 sticks) with a smaller unit, their footsteps.
- **Record** the result, for example: S1 throw = 26 footsteps; S2 throw = 23 sticks.
- **Ask**: Does that change who threw further? If students change their minds, ask why?
- **Explain** clearly the need to use uniform units for comparing. When you feel students understand the concept of uniform units, allow them to work with partners and compare throws.
- **Return** to class.

Whole class

- **Distribute** student copies of **LEARNING GUIDE 2: compare your throw with a friend's**.
- **Transfer** data onto individual record sheets

ASSESSMENT

- Students complete **LEARNING GUIDE 2: compare your throw with a friend's**.
- Discuss and assess answers to the following questions:
- Why should we not leave gaps when measuring?
- When comparing with a friend do we need to throw from the same spot? Why/Why not?
- Why was your unit a good/bad choice?
- Why do we have to measure with the same unit?



Lesson 4: Measuring and comparing using standard units

TEACHING RESOURCES

- spears, woomeras (available from Aboriginal community or students can bring spears from home)
- collection of tape measures, trundle wheels, metre rulers, metre lengths of string/wool ...
- students own metre rulers made using different materials (see below)
- class chart, **LEARNING GUIDE 3: record of distance travelled by spear (standard units)**
- easel
- marker pens
- student copies of **LEARNING GUIDE 3: record of distance travelled by spear (standard units)**

Preparation

- Prior to this measurement lesson take a lesson where students **construct** their own metre rulers using a variety of different materials/resources. For example, they may use MAB longs and small cubes to calibrate a tape or length of plastic pipe/dowel/cardboard ... in cms. They should also devise their own labelling system on their ruler, eg in ones, fives, tens ...
- **Organise** a collection of measuring tools (eg tape measures, trundle wheels, metre rulers ...)
- **Prepare** a chart-size class copy of the first section of **LEARNING GUIDE 3: record of distance travelled by spear (standard units)**, to use on an easel outside.

Implementation

- In classroom, prior to moving to the oval

Whole class

- **Compare and discuss metre rulers.** Ask questions

like: Is the same measurement on each tape? Why? Why not? How can you check that your measurement rulers match each other?

- **Move** students out onto the oval taking the metre rulers students made, collection of measuring devices, and class recording materials.

Working in groups or pairs

- **Select** (each student) a calibrated measuring tool, either the one they made or from equipment provided, to measure their throws.
- **Estimate** (each student) in metres and centimeters, how far their best throw will travel.
- **Then**, students take turns to work through the following steps.
- **Throw** spear and **measure** throw using selected measuring tool.
- **Record** first throw on class chart.
- **Repeat** process for subsequent throws (number of throws each will depend on number in groups).
- **Return** to classroom with class data.

Whole class

- **Distribute** student copies of **LEARNING GUIDE 3: record of distance travelled by spear (standard units)**.
- **Transfer** data onto individual learning guides.
- **Complete** self-reflection activity.

ASSESSMENT

- Students complete **LEARNING GUIDE 3: record of distance travelled by spear (standard units)**.
- Self-reflection responses indicate student participation and understanding.



Lesson 5: Graphing results

TEACHING RESOURCES

- graph paper
- matchsticks
- glue
- scissors
- paper
- marker pens
- computers (optional) to link to IT (to make graphs using Excel if you so choose)
- printer (optional)
- examples of different types of graphs
- data projector and screen (optional)

Preparation

- **Organise** above materials, and if using computers, organise access to them and the Excel program.

Implementation

Whole class

- **Discuss** meanings of ‘summarising’ and ‘representing’ data (see details in **Background information**).
- **Investigate** different types of graphs and how to interpret data they represent.
- **Examine** bar graphs, discussing what the axes tell us and how to interpret data recorded on them.
- **Compare** class chart of throws recorded in previous lesson, with graph samples.
- **Ask focus questions** like: Who threw the furthest? How much further did Dick throw than Harry? How far did John throw? Who threw further Peter or John? How could we show that John threw five and-a-bit metres?
- **Discuss** how easy it is to interpret the data on the class chart.
- **Ask:** Is there a different way to show who threw the spear furthest so it would be easier to interpret?
- **Draw** from the students that we could use a graph to represent our data.
- **Give** students opportunities to return to types of graphs discussed earlier, and to read and interpret information in them and on the class chart, and to decide on types of graph they could use to represent their data.

Proceed with one of the following options.

Option A – scale graphs hand drawn

- **Construct** a bar graph using pencils, rulers and graph paper. Some may construct horizontal bars other may construct vertical bar graphs.
- **Modify** graphs for tactile/visual learners using matchsticks to graph data. A challenge students will

need to overcome is to find a way to record parts of a metre (eg 16 and-a bit-metres).

- **Respond** once more to focus questions (above) using the graphic information. Ask: Which way is it easier to find the answers (interpret the information)?

Warning – don’t get caught up in the busy work of constructing the graphs and forget to interpret them. This is the whole point of the activity.

Option B – Excel programs to make graphs

For this option, you need a data projector, screen, computer and printer.

- **Model** the process of recording data using an Excel program.
- **Explain** the data as you record it on computer program.
- **Discuss** whether it is easy to interpret the data as entered.
- **Demonstrate** options by selecting different icons for graphs, and discuss each (eg Will a pie chart help? Why/why not?).
- **Make** a decision about which graph would show data in the best way to help answer the focus questions (interpret the data). Student responses may vary, allow them to justify choices.
- **Enter** data.
- **Print** individual copies of the graph each student chooses.
- **Interpret and respond** to focus questions using graphic information.

ASSESSMENT

Use student graphs and responses to focus questions as the basis for assessing understanding of the concept of recording and interpreting data on graphs.

EXTENSION AND INTEGRATION ACTIVITIES

Integration with literacy and physical education

Use Venn diagrams to compare the differences and similarities between throwing a spear and boomerang.

Use digital pictures to write a ‘How to throw a spear’ procedure book or ‘Rules for throwing spears’ book.

Integration with science and technology and enterprise

Types of wood used in spears: Where are the trees found? Which trees are used? Does it matter if different wood is used? Does the type of wood used affect the flight of the spear? Does lighter or heavier wood make a better spear? Do longer spears go further than shorter spears? Which other cultures in the world used similar tools to the spear and the woomera? Investigate.

Lesson 6: Spear throwing: understanding

TEACHING RESOURCES

- KWL chart completed throughout lesson series – What I know, What I want to learn, and What I have learnt.
- one copy of **LEARNING GUIDE 4: diagnostic task – spear throwing** (for teacher use, you may wish to make a larger copy on A3 paper to use with students you are assessing)
- A4 copies of **RECORDING SHEET: diagnostic task – spear throwing** for students requiring individual assessment
- materials for measuring, eg matches, blocks, counters, unifix cubes, toothpicks, paperclips, marbles

Preparation

Please note: As this task must be completed individually by each student being assessed, it will only be required when the teacher is unsure about a student's level of understanding of why the same unit of measurement must be used when comparing two distances. Adapt this lesson to suit the needs/levels of your students. It may also be used, where required, as a diagnostic or assessment instrument.

Please note that prior to presenting to a student a sheet containing a representation of the distance spears have been thrown, such as **RECORDING SHEET: diagnostic task – spear throwing**, it is important that the student has had the opportunity to engage in the hands-on activity. Without this prior experience the representation may be meaningless.

Implementation

Whole class

- **Engage** students in a discussion about what they have learned about spear throwing, in order to create a context for the activity, and to assess students understanding of why the same unit of measurement must be used when comparing two distances.
- **Enter** points raised on KWL chart (begun in lesson 1). An example table is shown below.

- **Integrate** cultural knowledge provided by the Elder and ask students to discuss what maths learning has now been added to this. You may revisit focus questions like: What makes someone a good spear thrower? How can you make a spear go further? Why do men use a woomera? How does it help? How will you know if your spear has gone further than someone else's? How can we measure the distances thrown? What is more important, distance or accuracy? If we were out in the bush, how might we measure the throw? Does aiming high change the distance thrown?
- **Discuss** focus questions using a co-operative learning strategy like: think, pair, share.

ASSESSMENT

- Observe and record on checklist how students participated in class discussion and their understanding of maths concepts involved.
- To assess understanding of students about whom you are unsure, use **LEARNING GUIDE 4: diagnostic task – spear throwing** (for years 1 – 4). This is an adaptation of *The First Steps in Mathematics task called Snail Trails*.

Conduct individual interviews as follows:

- **Show** student **LEARNING GUIDE 4: diagnostic task – spear throwing**, and the materials they may use for measuring, eg matches, blocks, counters, unifix cubes, toothpicks, paperclips, marbles ...
- **Explain** that you want them to show you how to answer the question, 'Which throw was longer?' using information they have learned in the spear throwing lessons.
- **Follow** instructions on **LEARNING GUIDE 4: diagnostic task – spear throwing** to find out if student can measure lines to identify the longer one, and to check if they understand the reason for this.
- **Record** student's responses using a sheet for each student who completes the task.

WHAT I ALREADY KNOW ABOUT SPEARS	WHAT I WANT TO LEARN ABOUT SPEARS	WHAT I LEARNT ABOUT SPEARS
Aboriginal people used them for hunting. Girls can't throw them. Spears were made from special trees called _____. *A woomera makes a spear go further.	Do Aboriginal people still hunt with spears? How do you make a spear? *Who will throw the greatest distance? Who teaches you how to make spears? What is a spear called in Aboriginal language?	A spear is called _____. It is made from _____ trees. Men teach boys how to make spears. *Spears are made for each boy based on his arm length.

* These points relate to mathematical understandings.



LEARNING GUIDE 1: record of distance travelled by spear (non-standard units)

Name: _____ Date: _____

Instructions:

- Enter your name and results on the table below.
- Choose four of your group members and enter their names and results on the table.
- Be sure you include the unit of measurement that each person used.

NAME	ESTIMATION OF BEST THROW	THROW 1	THROW 2	THROW 3	CHOSEN UNIT OF MEASURE

My maths reflection

Now, reflect on the spear throwing activity and write responses to the questions below:
Can you compare results of the spear throwing to see who threw the spear furthest? Why/why not?

Which of the things you tried to measure with made it easiest to decide who could throw furthest?

Did you experience any problems in the activity? Explain what they were.



LEARNING GUIDE 2: compare your throw with a friend's

Name: _____ Date: _____

Instructions:

- Enter your results on the table below.
- Answer the question.
- Draw the picture.

HOW FAR?	WHAT DID YOU USE TO MEASURE?	MY THROW	MY FRIEND'S THROW

My maths reflection

Now, reflect on the spear throwing activity and write responses to the questions below:

Can you compare results of the spear throwing to see who threw the spear furthest? Why/why not?

Whose throw was the longest?

Draw a picture of how you compared it.



LEARNING GUIDE 3: record of distance travelled by spear (standard units)

Name: _____ Date: _____

Instructions:

- **Enter** your results on the table below.
- **Reflect** on the activity and what you've learned.
- **Answer** the questions.

NAME	CHOSEN MEASURING TOOL	ESTIMATION USING METRES AND CM	DISTANCE THROWN

Self-reflection
My maths journal

What did I learn today?

What do I need more help with?

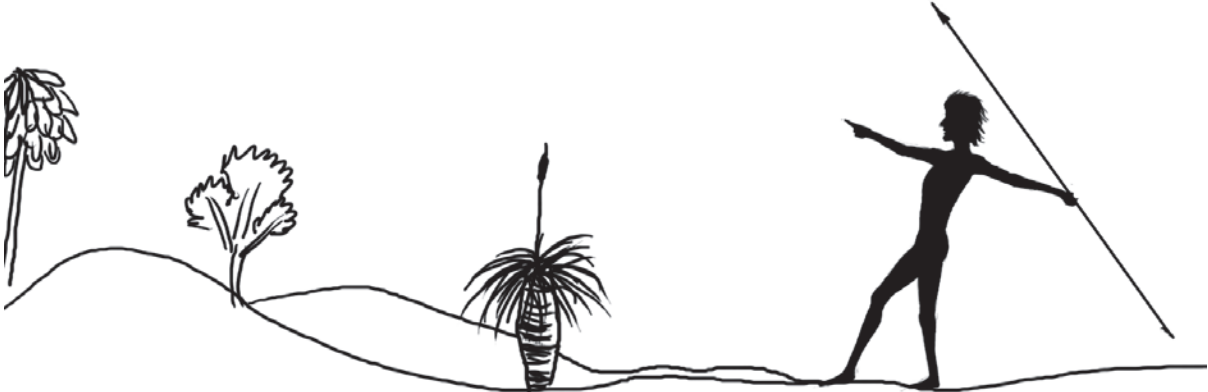
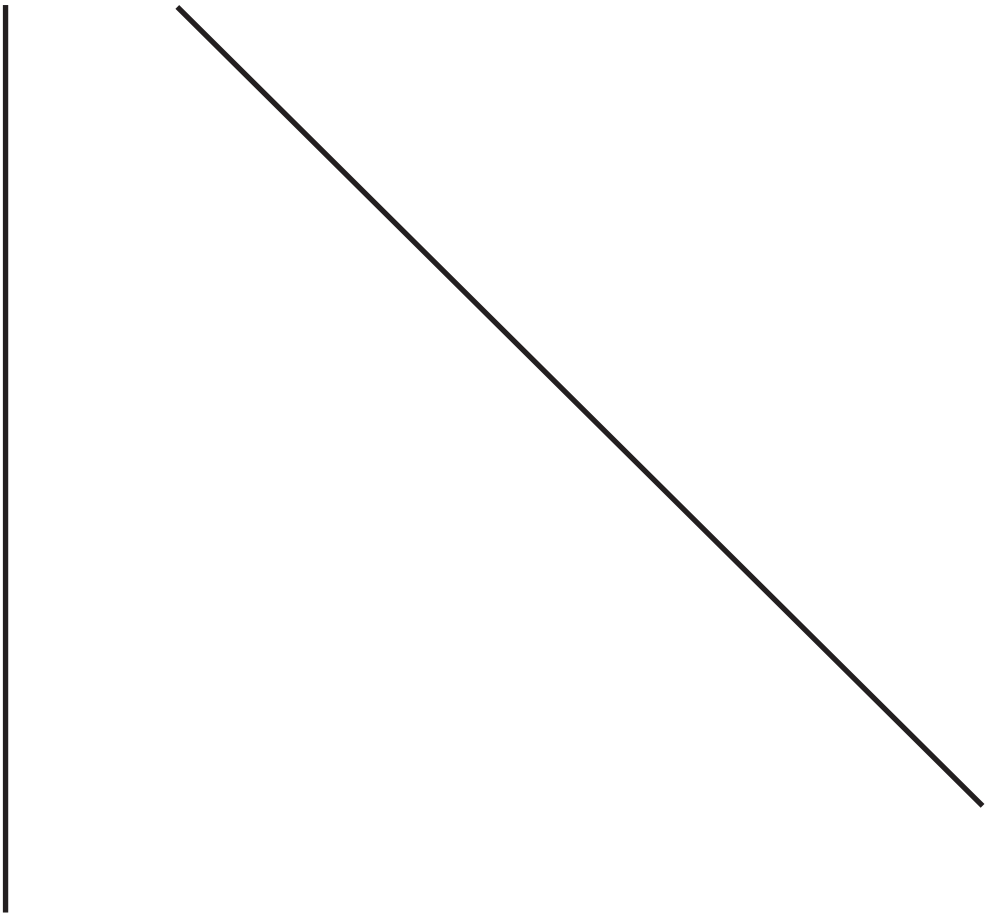
Did I enjoy doing maths today? Why?



LEARNING GUIDE 4: diagnostic task – spear throwing

Name: _____ Date: _____

- The two lines show how far two spears travelled.
- Which throw was longer?





RECORDING SHEET: diagnostic task – spear throwing

Name: _____ Year level _____ Date _____

PURPOSE: To find out if students understand why they must choose the same object as a unit of measurement when comparing two distances.

- Look at the picture. The lines show how far two spears travelled. Can you tell me which one was thrown the longer distance? Can you work out which is the longer line? Use these materials to help you measure them.
- If child is unsure of what to do point to one line, and prompt:
- **Can you use any of these materials to find out how long this throw is?**
- Or indicate cubes and prompt: **How many of these fit along this line?**
- If child does not measure the other line independently, prompt child to do so.

Record what student does:

If child does not say which line is longer after placing materials on each line, ask, **'Now can you tell me which is the longer line?' How do you know?**

Record student's responses:

If child chooses the same unit to measure both lines, remove units from the shorter line and replace with a smaller unit. For example, if child chose matches remove these from the shorter line and place counters along it instead. If child used the smallest unit available, remove these from the longer line and place larger units along that line. Now ask the child:

- **How many counters** (or whatever unit used) **fit along here?** (point to the shorter line)
- **How many matches** (or whatever unit used) **fit along here?** (point to the longer line)
- **Which line is longer? How do you know?**

Record student's responses:

If the child changes his/her decision about the longer line, ask, **How come you have changed your mind?**

Record student's responses:
