

Investigation Goldilocks

The children's fairytale, *Goldilocks and the Three Bears*, provides the context for an Investigation into how Goldilocks makes amends for her bad behaviour by inviting the Three Bears to a special morning tea. Students will practise and consolidate many early mathematical concepts, including matching, ordering, sequencing, collecting data, fractions and sharing as they re-enact the story, make sandwiches and work out how to share them equally.



Student Book links

The following Tear-outs are essential to this Investigation. They can be found in the back of the Student Book, or downloaded from www.imathsteachers.com.au.

- Tear-out 6** Sort and Match 1 page 109
- Tear-out 7** Sort and Match 2 page 111
- Tear-out 8** Goldilocks sequence page 113
- Tear-out 9** Halves page 115

The following Topic pages can be used to introduce or consolidate the maths concepts in this Investigation.

- NA6** Groups of 3 page 13
- NA7** Fruit face count..... page 13
- NA8** Food count at the zoo..... page 15
- NA11** Traffic count..... page 18
- NA16** Worm count..... page 24
- NA18** See the pattern..... page 26
- NA19** Turtle patterns page 27
- NA37** Animal patterns page 47
- NA59** Three little pigs share equally page 69
- MG13** Budgies in a row – smallest to biggest..... page 83
- SP4** Favourite playtime activity..... page 96

It's iMaths Time CD tracks

Track 23: *When Goldilocks went to the house of the bears*



Essential word list

Comparative language

big, bigger, biggest; small, smaller, smallest; large, larger, largest; less, more; least, most; the same as; too hot, too cold

Attributes

cold, hot, just right; hard, soft; big, small, middle-sized; full, empty

Positional language

first, next, last, before, after; on, off; top, bottom; on top

Common 2D shapes

circles, triangles, rectangles, squares, diamonds, hearts

Fractional language

whole; part of, slice of, piece of, fraction of; half; halves, middle; quarters (optional); equal parts; share equally



Investigation 4 Goldilocks

Investigation overview

Below are the activities that occur within each step. Detailed explanations for each activity can be found on pages 59–65.

Step 1. The Three Bears

- **Goldilocks and the Three Bears** – read the story of *Goldilocks and the Three Bears* aloud to class.
- **Goldilocks story sequence** – students set up a role play area and act out the story of *Goldilocks and the Three Bears*.

Resources

Book: *Goldilocks and the Three Bears*

Props: table, chairs, bowls, spoons, beds, letterbox

Tear-outs: Tear-outs 6 and 7 (*Sort and match*), Tear-out 8 (*Goldilocks sequence*)

iMaths CD: *When Goldilocks went to the house of the bears* (track 23)

Step 2. An invitation

- **Morning tea foods** – identify appropriate foods for a morning tea with the Three Bears.
- **Favourite sandwiches** – collect data about what are the favourite sandwiches among classmates.
- **Class picture graph** – create a class picture graph using the collected data about favourite sandwiches.

Resources

Props: A3 envelope and written invitation

BLM: 4.1

Step 3. Sandwiches for lunch

- **How to make a sandwich** – discuss and demonstrate how to make a sandwich.
- **Halves and quarters** – explore the concept of a fraction as part of a whole; and half, meaning 2 equal pieces that make a whole.
- **Equal shares of collections** – practise the concept of sharing equally between groups.

Resources

Props: Foods that can be cut in half, coloured paper squares and shapes, paper plates and concrete materials

BLM: 4.2

Tear-outs: Tear-out 9 (*Halves*)

Step 4. Morning tea

- **Plan the morning tea** – help Goldilocks plan her morning tea for the Three Bears.
- **Design placemats** – make and decorate placemats for the Three Bears' morning tea.
- **Making the sandwiches** – investigate how to share the sandwiches equally and use the concept of one-to-one correspondence to set the table for the Three Bears' morning tea.

Resources

Props: A3 paper, bread, butter, honey, bread board, plastic knives, napkins

BLMs: 4.3, 4.4 and 4.5

Explore and Play

Indoor activities:

- Three Bears puppets
- Three Bears bingo game
- Let the porridge cool board game
- Playdough activity
- Make and taste porridge
- Collage
- Construction
- Weblinks
- Songs

Outdoor activities:

- Teddy Bear's picnic
- Bear's obstacle course
- Build the Three Bears' cottage
- Sandpit play

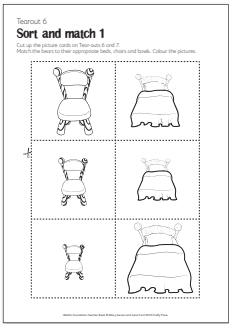
Resources

BLMs: 4.6–4.11

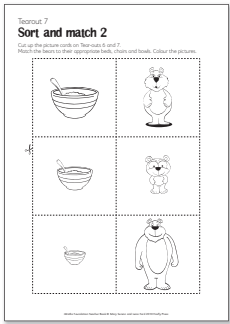
iMaths CD: *Going on a bear hunt* (track 26); *Teddy bear, teddy bear, turn around* (track 25)

Tear-outs & Black Line Masters

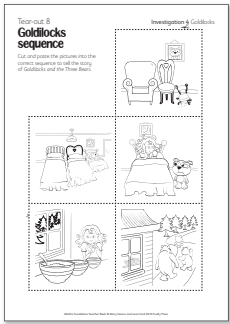
Tear-outs and Black Line Masters are available exclusively to classes that booklist iMaths Student Books. Download them from www.imathsteachers.com.au.



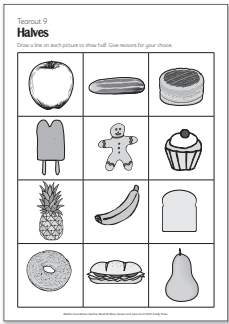
Tear-out 6*



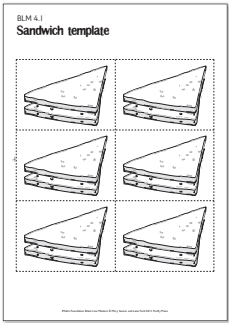
Tear-out 7*



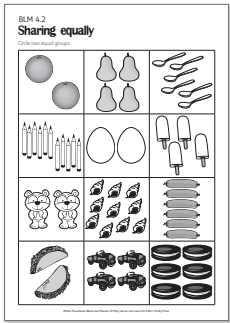
Tear-out 8*



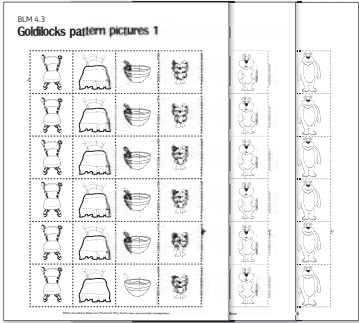
Tear-out 9*



BLM 4.1



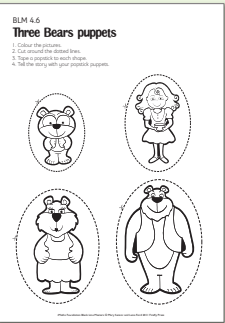
BLM 4.2



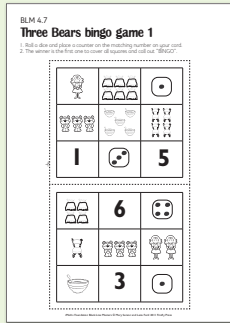
BLMs 4.3-4.5

* These Tear-outs can also be found in the back of the Student Book.

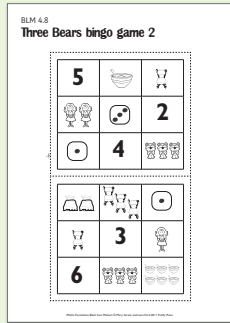
Explore and Play Black Line Masters



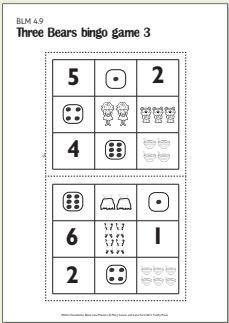
BLM 4.6



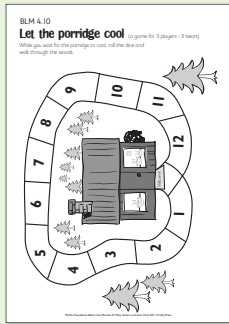
BLM 4.7



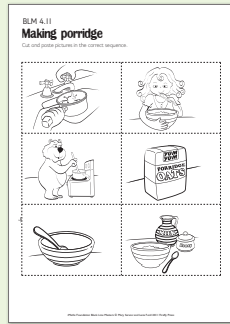
BLM 4.8



BLM 4.9



BLM 4.10



BLM 4.11

Investigation 4 Goldilocks

Curriculum match for Investigation 4

The grid below shows the content descriptions for each of the content strands that are addressed in Investigation 4.

Content strand	Content description	Investigation 4 references
Number and algebra	<p>Number and place value</p> <ul style="list-style-type: none">• Subitise small collections of objects.• Compare, order and make correspondences between collections, initially to 20, and explain reasoning.• Represent practical situations to model addition and sharing. <p>Patterns and algebra</p> <ul style="list-style-type: none">• Sort and classify familiar objects and explain the basis for these classifications. Copy, continue and create patterns with objects and drawings. <p>Fractions and decimals*</p> <ul style="list-style-type: none">• Recognise and describe one-half as one of two equal parts of a whole.	<p>Step 1, 2 & 3</p> <p>Step 1, 2 & 4</p> <p>Step 3 & 4</p> <p>Step 4</p> <p>Step 3 & 4</p>
Measurement and geometry	<p>Using units of measurement</p> <ul style="list-style-type: none">• Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language.• Compare and order the duration of events using the everyday language of time. <p>Shape</p> <ul style="list-style-type: none">• Sort, describe and name familiar two-dimensional shapes and three-dimensional objects in the environment.	<p>Step 1</p> <p>Step 1</p> <p>Step 3</p>
Statistics and probability	<p>Data representation and interpretation</p> <ul style="list-style-type: none">• Answer yes/no questions to collect information.	<p>Step 1</p>

*Note – This concept is beyond the Mathematics Achievement Standard for the Foundation Level as outlined in the Australian Curriculum.

Let's get started

Goldilocks has invited the Three Bears to morning tea. The Bears' favourite food is honey sandwiches. She has 4 slices of bread and some honey. Investigate how Goldilocks can make honey sandwiches and share them equally with the Three Bears.

Step 1. The Three Bears

Goldilocks and the Three Bears

Read the story *Goldilocks and the Three Bears* aloud to the class.

Focus on words that describe attributes, such as *too hot*, *too cold*, *too soft*, *too hard*, *too small*, *too big*, *small*, *middle-sized* and *big*.

▶ Play and sing *It's Maths Time* CD, track 23: *When Goldilocks went to the house of the bears*.

Goldilocks story sequence

Students set up a role play area and act out the story of *Goldilocks and the Three Bears*.

Ask students to help set up the drama or role play area, using props to create the Three Bears Cottage. Use a table and 3 different sized chairs, bowls, spoons and beds. Add a letterbox prop with a number (1–10) clearly shown.

Ask students to help label the props, eg *small chair*, *middle-sized chair* and *big chair*. Then, retell the story, with students taking turns playing the parts of characters in the story.

Encourage students to use the correct sequence of events and comparative language as they take turns playing the various character parts – Narrator, Goldilocks, Father Bear, Mother Bear and Baby Bear. For example:

Narrator: First, Goldilocks tried the porridge in the big bowl.

Goldilocks: This porridge is too hot!

Narrator: Next, Goldilocks tried the porridge in the middle-sized bowl.

Goldilocks: This porridge is too cold!

Students use **Tear-outs 6** and **7** pages 109 and 111 of the Student Book to cut, sort and match bears to beds, chairs and bowls.

As a follow up, they can use **Tear-out 8** on page 113 of the Student Book to colour, cut and place pictures into correct order. The pictures can be stapled to make a booklet to take home.



Focus questions

- * Why did the Three Bears go out for a walk?
- * What happened next?
- * Which bowl of porridge did Goldilocks eat? Why?
- * What happened after that?
- * Why did she choose Baby Bear's bed to sleep in?
- * How did the story end?
- * If you could change the ending, what would it be?

Suggested Student Book pages

- NA6** Groups of 3 (page 13)
- NA7** Fruit face count (page 14)
- NA8** Food count at the zoo (page 15)
- MG13** Budgies in a row – smallest to biggest (page 83)

Investigation 4 Goldilocks

Step 2. An invitation

Morning tea foods

Students identify appropriate foods for a morning tea with the Three Bears.

Prepare an invitation for Morning tea, addressed to the Three Bears, from Goldilocks (see Fig 4.1). Read the invitation to the class and let the students know that they will be helping Goldilocks prepare the morning tea.

Brainstorm, list and draw some possible morning tea foods, eg honey sandwiches, pancakes, muffins, honeycomb and honey cookies.

Guide students to the idea that honey sandwiches would be the best option for the bears' morning tea, as they are easy to make and delicious too.

Favourite sandwiches

Students collect data about what are the favourite sandwiches among classmates.

Discuss and list some different types of sandwiches (vegemite, honey, salad, jam, cheese, ham and peanut butter). Ask students for suggestions as to how we can find out which sandwiches from the list are the class favourites. Students may suggest putting hands up, drawing a picture or standing up, as in a people graph.

Class picture graph

Create a class picture graph using the collected data about favourite sandwiches.

Use BLM 4.1 or ask students to draw their favourite sandwich on a small piece of paper, and glue the sandwich to a large class picture graph (see Fig 4.2). Ensure the graph is appropriately labelled.

Communicating and reflecting

- How many people in our class liked honey sandwiches best?
- How many people in our class liked ham and cheese sandwiches best?
- What is the most popular sandwich?
- What is the least popular sandwich?
- Which sandwich would be the Three Bears' favourite?

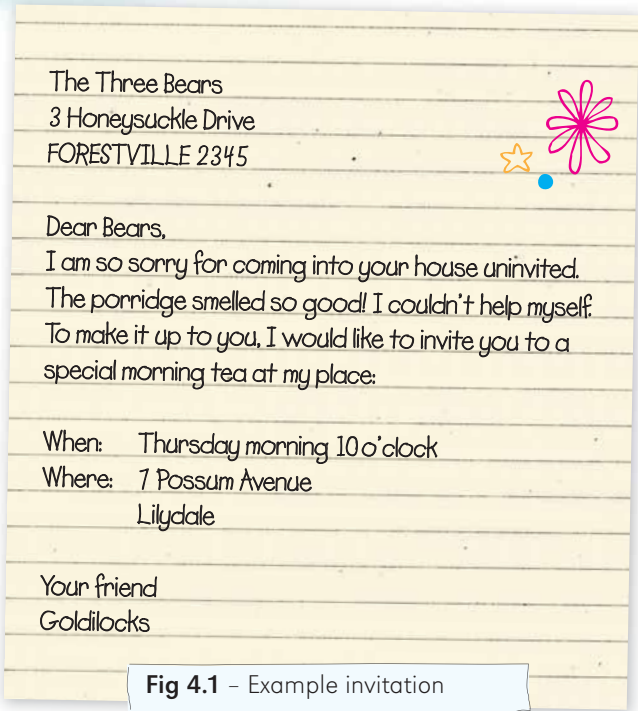


Fig 4.1 – Example invitation

Suggested Student Book page

SP4 Favourite playtime activity (page 96)



Fig 4.2 – Example Class picture graph

Step 3. Sandwiches for lunch

How to make a sandwich

Discuss and demonstrate how to make a sandwich.

Use 2 slices of bread and a simple filling, such as jam or vegemite.

Ask students to bring in their lunchboxes to see who has sandwiches for lunch. Have them show and describe their sandwiches – quantity, fillings, shape, size and how they are cut. For example: *I have 4 cheese soldiers. I have 2 small triangle sandwiches. I have half a sandwich with ham and salad.*

Sandwiches can be cut in many different ways. Ask students how they best like their sandwiches cut, eg triangles, rectangles, squares, crusts off, soldiers or other shapes (cookie cut shapes).

Halves and quarters

Students explore the concept of a fraction as part of a whole and half, meaning 2 equal pieces that make a whole.

Demonstrate this by cutting a variety of foods in half. Use foods such as a sandwich, an apple, cookie, pizza or muesli bar.

To reinforce the idea of halves, give students objects that can be easily folded, pulled apart, split up, coloured in or cut, eg coloured paper shapes, pictures in magazines, long strips of paper, multilink cubes etc. Remind students that halves must be 2 equal pieces.

Students use **Tear-out 9** on page 115 of the Student Book to show halves. Have them draw a line through each picture to show halves. Ask them to justify their choices, as some pictures can be halved in more than one way.

Using coloured square pieces of paper to represent sandwiches, ask students to fold and cut their sandwich in half.

There are different ways to cut a sandwich in half, so encourage students to explore as many different ways as possible (see **Fig 4.3**). As an option, you could introduce quarters as half then half again, or 4 equal parts. For example: “What happens if we fold our sandwich again? We get 4 equal parts.”

Ask students to paste their sandwiches to paper plates. Add labels, for example *I cut my sandwich in half. I made 4 soldiers from my big sandwich.* (see **Fig 4.4**)

Focus questions

- * What does cutting something in half mean? (Cutting it into 2 equal parts.)
- * What happens if I do not cut down the middle? (The pieces would not be equal.)

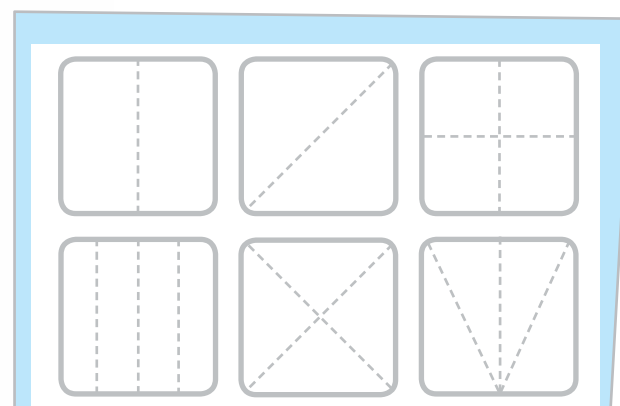


Fig 4.3 – Cutting sandwiches in halves and quarters

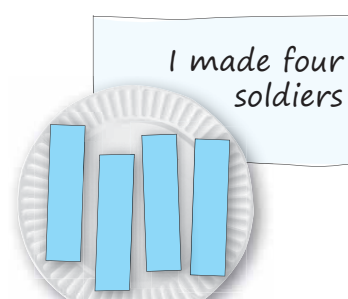


Fig 4.4 – Paper plate sandwiches

Investigation 4 Goldilocks

Step 3. Sandwiches for lunch (cont.)

Equal shares of collections

Students practise the concept of sharing equally between groups.

In some situations, folding or splitting in half may not work. The concept of fair sharing can be introduced. Provide groups of real or everyday objects, pictures or other representations to demonstrate sharing equally to the class.

For example:

"I have 4 cookies and I want to eat half of my cookies at lunch and half of my cookies at afternoon tea. How do I work out half of 4 cookies?"

"I have 3 cookies to share equally between 2 children. What would I do?"

"I have a bag of 10 marbles, which I want to share fairly between Luke and Amy. I want them to have half each. How do I do this?"

This is an ideal time to use the problem solving strategy, *Draw a picture or diagram* (see **Fig 4.5**). See page 14 for more information on problem solving strategies.

Note: It is important that students realise that a 'whole' is not always a single object, but can be a group of objects, eg a whole bag of cookies, a tower of cubes or a carton of eggs.

Focus questions

- * In what situations does cutting in half not work?
- * What does sharing equally mean?
- * What happens if I try to share an odd number of things equally?

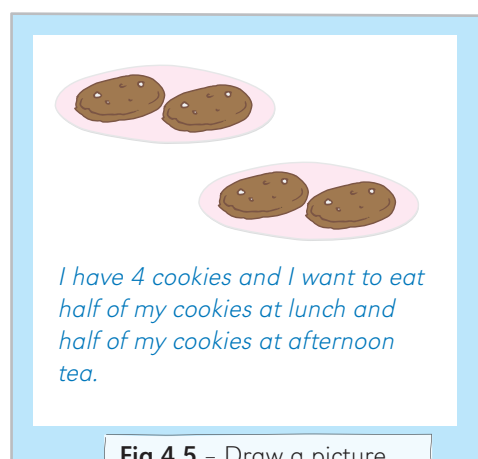


Fig 4.5 – Draw a picture

Suggested Student Book page

NA59 Three Little Pigs share equally
(page 69)



Step 4. Morning tea

Plan the morning tea

Students help Goldilocks plan her morning tea for the Three Bears. What do they need to do to achieve this?

Remind students that they had already decided that honey sandwiches were on the menu. Goldilocks has 4 slices of bread and some honey. We must investigate how she can make sandwiches to share them equally.

Creative thinking strategy

Use Edward de Bono’s *White Hat thinking strategy* to clarify what facts students already have and what they need to find out.

Ask students to put on their White Thinking Hats (for facts and information) and answer the following questions:

- 1. *What do we have to do?*
Organise a morning tea
- 2. *When is the morning tea?*
Thursday morning
- 3. *Who is coming?*
The Three Bears
- 4. *What do we need to set the table?*
Table, chairs, placemats, plates and cups
- 5. *What are we eating?*
Honey sandwiches
- 6. *Do we have the ingredients?*
Yes, but we only have 4 slices of bread
- 7. *What else do we need to do?*
Make and decorate the placemats

Design placemats

Students make and decorate placemats for the Three Bears’ morning tea.

Provide each student with a piece of card on which to design a placemat with a simple repetitive pattern. Use small pictures (BLMs 4.5, 4.6 and 4.7) around the edges of the placemat. Alternatively, you may provide stickers, pre-cut shapes or other materials.

Repetition in the pattern may be based on:

- Pictures (tree, bowl, tree, bowl)
- Size (big bed, little bed, big bed, little bed)
- Colour (red bowl, green bowl, red bowl, green bowl).

Laminate the placemats if you wish, and then students may use them later when eating their own lunch (see Fig 4.6).

Focus questions

- * How many placemats do we need?
- * How many plates do we need?
- * How many cups do we need?
- * How many sandwiches do we need?



Suggested Student Book pages

- NA18 See the pattern (page 26)
- NA19 Turtle patterns (page 27)
- NA37 Animal patterns (page 47)
- NA16 Worm count (page 24)

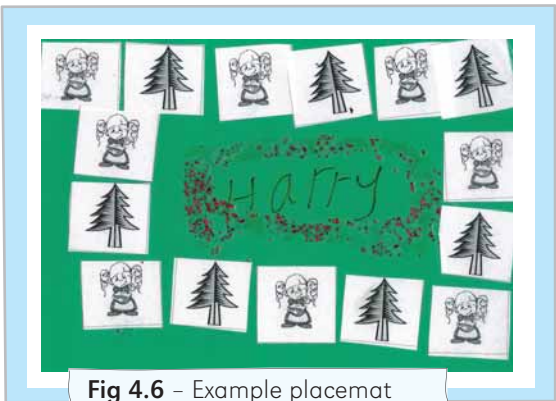


Fig 4.6 – Example placemat

Investigation 4 Goldilocks

Making the sandwiches

Students investigate how to share the sandwiches equally and use the concept of one-to-one correspondence to set the table for the Three Bears' morning tea.

You may wish to do this as part of a rotational activity during indoor play. Invite students to do the activity in groups of 2 or 3. Have a small table prepared, with student-designed placemats, paper plates, slices of bread, honey etc.

Ask students to set the table for the Three Bears' morning tea, without forgetting a place for Goldilocks. Students are to collect the correct number of plates, cups and placemats. Then, ask them to work out how they can make the sandwiches using 4 slices of bread.

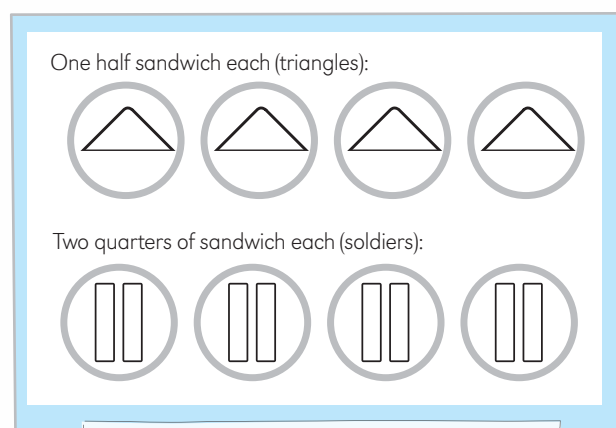
Students will find that they need to divide the sandwiches into 4 equal portions. There are a number of ways that students could cut their sandwiches, being variations of either a half sandwich each, or two quarter sandwiches each (see **Fig 4.7**).

Take a digital photo of the finished table setting, as each group completes the task. Have students draw the 4 plates and sandwiches to show how they shared the sandwiches equally. Then, enjoy eating the sandwiches.

Display the drawings and photos of finished table settings and sandwiches each time. Ask groups of students to explain how they set the table and solved the problem.

Communicating and reflecting

- How did you work out how many placemats, cups and plates you needed?
- What are the steps in making a honey sandwich?
- What shapes did you make your sandwiches?
- Did you share the sandwiches equally?
- How did you share the sandwiches equally?
- Explain the pattern on your placement.



Making connections

Discuss the following questions to encourage students to apply what they have learned in this Investigation to other everyday situations.

- What times have you needed to share something?
- When is it important to know how many items are needed? (*Setting table, games, sport, giving out books etc.*)
- What are some other times you have shared things at home or at school?
- What are some times when you have shared half of something?

Explore and play

Students explore and consolidate concepts covered in this investigation in fun and engaging ways. Remember to play the *It's iMaths Time* CD for students to enjoy as they work through the activities.

Indoor activities

Three Bears puppets – use **BLM 4.6** to make puppets and retell the story.

Three Bears bingo game – use **BLMs 4.7, 4.8** and **4.9**. Roll a dice and match to bingo cards containing numbers and pictures.

Let the Porridge cool board game – use **BLM 4.10**. Roll the dice and move that many spaces through the woods. The winner is the first one back to the cottage.

Playdough activity – make breakfast for the Three Bears, showing comparative size and/or quantities for each. For example, one sausage for Baby Bear, two for Mother Bear and three for Father Bear. Place on paper plates.

Make and taste porridge – read and discuss the recipe for porridge step-by-step. Make porridge, and allow each student a turn to stir. Follow up with *Making porridge* sequencing sheet, **BLM 4.11**.

Collage – create Three Bears collage pictures using coloured or wrapping paper. Model how to cut out some of the shapes (bowls, beds, bear's faces etc), before students have a turn. Discuss the relative sizes of the shapes as you go: "This is the big bowl. Now, the middle-sized bowl needs to be a bit smaller. I'll make the little bowl really tiny."

Construction – design and construct a bed, pillow and

blanket of the appropriate size for a given teddy or doll. Use recycled materials, eg tissue boxes, foil pans, cereal boxes, fabric scraps and cotton wool.

Visit www.imathsteachers.com.au and click on the weblinks for activity ideas.



It's iMaths Time songs

Track 25: Teddy bear, teddy bear,
turn around

Track 26: Going on a bear hunt

Outdoor activities

Teddy bears' picnic – students prepare plates of small, medium sized and large crackers with jam, vegemite or cheese spreads to share at a teddy bears' picnic.

Bear's obstacle course – ask students to follow a set sequence of actions/movements along a prepared obstacle course. For example: Climb up the ladder and across the bridge (plank). Then, weave in and out of the forest (witches hats). Next, cross the river by jumping onto the stepping-stones (plastic markers). Lastly, go through the tunnel to your cave.

Build the Three Bears' cottage – use large wooden boxes, large sheets and fabric pieces.

Sandpit play – role-play making and serving breakfast for the Three Bears. Use old cake pans, bowls, spoons, pots, jugs etc.



Investigation 4 Goldilocks

Investigation 4 checklist

The checklist provides a snapshot of the student’s learning and development through this Investigation, and should be used in conjunction with other collected evidence for planning and reporting.

Download this checklist from www.imathsteachers.com.au and print one for each student.

Steps	Content strand and description	Task and Proficiency Strand	Demonstrates understanding	Working towards understanding	Needs support
1	MG Using units of measurement Use direct and indirect comparisons to decide which is longer heavier or holds more, and explain reasoning in everyday language.	Uses everyday language to compare attributes in Goldilocks and the Three Bears. Fluency			
1	MG Using units of measurement Compare and order the duration of events using the everyday language of time.	Places pictures of the Goldilocks story in the correct sequence. Fluency			
2	SP Data representation and interpretation Answer yes/no questions to collect information.	Describes ways to collect data about the class’s favourite types of sandwich, and helps construct a picture graph Fluency			
2	SP Data representation and interpretation Answer yes/no questions to collect information.	Uses the graph to explain which sandwiches are the most popular and the least popular. Understanding, Reasoning			
3	NA Fractions and decimals Recognise and describe one-half as one of two equal parts of a whole.*	Describes and shows how to cut a sandwich in half. Understanding, Reasoning			
3	MG Shape Sort, describe and name familiar two-dimensional and three-dimensional objects in the environment.	Recognises 2D shapes – triangles, rectangles, squares. Understanding			
4	NA Patterns and algebra Sort and classify familiar objects and explain the basis for these classifications. Copy, continue and create patterns with objects and drawings.	Designs and makes a placemat with a simple repetitive pattern. Understanding, Fluency			
4	NA Number and Algebra Compare, order and make correspondences between collections, initially to 20, and explain reasoning.	Determines how many placemats, cups, plates are needed to set a table for four people. Problem solving, Fluency			
4	NA Number and place value Represent practical situations to model addition and sharing	Explains how to share the honey sandwiches equally four ways. Problem solving, Reasoning			

*Note – This concept is beyond the Mathematics Achievement Standard for the Foundation Level as outlined in the Australian Curriculum.