

Tutor Guidelines

Functional Mathematics

Level 4 Unit 1: Number



Acknowledgements

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NALA:

Bláthnaid Ní Chinnéide
Mary Gaynor
Fergus Dolan
John Stewart
Dr Terry Maguire (Institute of Technology, Tallaght)

NCEMS-TL:

Prof. John O'Donoghue
Dr. Mark Prendergast
Dr. Miriam Liston
Dr. Niamh O'Meara

FÁS:

John O'Neill
Louise MacAvin

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Tutor Guidelines for Activity N1: Mountain climbing**Activity** **Mountain climbing** **N1**

This activity links to **learning outcomes 1.1 and 1.3.**

Learning Outcomes

1. Round natural numbers to the closest ten, hundred or thousand.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Estimating natural numbers
2. Rounding off natural numbers
3. Exploring examples of mathematics in the world around us

Materials you will need for this activity

- Internet access or a printout of the following webpage:
http://en.wikipedia.org/wiki/List_of_highest_mountains)
- Practice Sheet N1
- Solution Sheet N1

Tutor Guidelines for Activity N1: Mountain climbing

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N1: Mountain climbing

Guiding the learners through Activity N1

- Mountain Climbing – introduce and develop the concept of estimation and rounding off through real life activities of interest to the learners.
- Explain what the learners will be able to do after this activity.
- Use questions and discussion to introduce this topic in the whole group. Help learners think about and talk about their **prior experience of large natural numbers**. For example: Can you think of any times you met large natural numbers in your everyday life? Were these numbers easy to handle? Would it be easy to add, subtract, multiply and divide these numbers? Can you think of any way to make these numbers easier to work with?
- Before introducing approximating or rounding off numbers, **explain place value**. Understanding place value will allow learners to see what each digit in a large number represents.
- Then **introduce** learners to the concept of **rounding off**. In general, when a digit is greater than five the previous digit increases by 1. If the number is less than five then the previous digit remains the same. Encourage learners to **recap** on this from **Level 3** Functional Mathematics Unit 1 and/or from Level 3 Application of Number Unit 1.
- **Explain** and **demonstrate** the concepts and procedures by working through the **Worked Example** on the whiteboard or flipchart. Ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.

Tutor Guidelines for Activity N1: Mountain climbing

- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.
- When you judge that learners are ready, invite them to try the **tasks**. In Task 2, learners are asked to use the internet to find the heights of the five highest mountain ranges in the world. Then they are asked to fill in the table. You could change or adapt this task to find the highest mountains in Ireland or Europe.

As well as **individual** work, learners could work in **pairs** or small **groups** to discuss their method and answers.

- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Help learners **plan** their next activities to build on the learning from the tasks they have just completed.
- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.

Tutor Guidelines for Activity N1: Mountain climbing

- Facilitate the group to build a **group glossary** of mathematical terms.
- Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.
- **Practice Sheet N1** will give learners a chance to practise rounding off more figures to either tens, hundreds or thousands.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N2: Calculations**Activity****Calculations****N2**

This activity links to **learning outcomes 1.1 and 1.4.**

Learning Outcomes

1. Use a calculator with confidence to perform extended calculations, requiring functions such as addition, subtraction, multiplication, division, percent, square-root, pi, 1/x, scientific notation keys, memory keys and the clear key, while following the conventions of precedence of operations.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Performing addition, subtraction, multiplication and division operations on a calculator
2. Using the calculator to solve problems requiring operations such as percent, square-root, memory keys and the clear key
3. Becoming familiar with and confidently using specific keys on the calculator such as the power key, pi, 1/x, scientific notation keys as well as the use of the second function key
4. Exploring example of mathematics in everyday life
5. Recognising the relevance and usefulness of mathematics in everyday life

Materials you will need for this activity

- Practice Sheet N2
- Solution Sheet N2
- Scientific calcu

Tutor Guidelines for Activity N2: Calculations

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could **create and use** quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N2: Calculations

Guiding the learners through Activity N2

- Calculations – the aim of this activity is to show learners **how to use the calculator** to perform addition, subtraction, multiplication and division. It also covers other key calculations such as using the pi and square root functions through real life activities of interest to the learners.
- Explain what the learners will be able to do after this activity.
- Many of the learners may be familiar with using calculators particularly from Level 3. Use questions and discussion to find out how much the learners already know about calculators and the functions of the calculator. When do the learners use calculators in their everyday lives?
- Learners will have different calculators and you may need to show them, or ask them to show each other, specific points about their own calculators, such as where the pi or square root buttons are.
- It is important to encourage them not to rely only on their calculator. Even if they have a calculator they need to know how to perform mathematical operations mentally and manually. For example, ensure learners understand what it is they are actually finding when they ‘get the square root’ of a number.
- Ensure that after this activity the learners are competent at using a calculator for different mathematical operations. Encourage learners to work out whatever they can first, before turning to the calculator.

Tutor Guidelines for Activity N2: Calculations

Always encourage learners to estimate or have a rough idea of their answer **before** using their calculators.

- Throughout the module, encourage learners to use the calculator to **check** their own calculations.
- **Practice Sheet N2** will give learners a chance to practise using their calculators to perform different mathematical operations.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N3: The solar system**Activity****The solar system****N3**

This activity links to **learning outcomes 1.1 and 1.2.**

Learning Outcomes

1. Convert from scientific notation to standard form and standard form to scientific notation.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Understanding the concept or idea of scientific notation
2. Converting from standard form to scientific notation
3. Converting from scientific notation to standard form
4. Exploring examples of mathematics in everyday life
5. Recognising the importance of mathematics in the world around us

Materials you will need for this activity

- Practice Sheet N3
- Solution Sheet N3

Tutor Guidelines for Activity N3: The solar system

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N3: The solar system

Guiding the learners through Activity N3

- The Solar System – introduce and develop the concept of **scientific notation** through real life activities of interest to the learners.
- Explain what the learners will be able to do after this activity.
- Explain that **scientific notation is simply a strategy that allows us to handle really big or really small numbers.**
- Then ask learners about where they may have met really **big** numbers, such as greater than one million, or really **small** numbers, for example, less than one thousandth. You could suggest some examples such as the lotto fund, populations, the size of atoms or the differences in racing times.
- It may be worthwhile to teach this topic in conjunction with **Activity A2 in Level 4 Unit 2, Indices**. The reason for this is that a good understanding of what an index number actually means may help learners to develop a better understanding of scientific notation.
- Inform learners that when ‘determining the power’ in each example, ‘power’ indicates the number of places we want to shift the decimal point in order to get back to the number we started with.
- Also ensure that learners know the significance of a negative or positive power and how the sign actually affects the question.

Tutor Guidelines for Activity N3: The solar system

- **Explain and demonstrate** the concepts and procedures by working through each example on the whiteboard or flipchart. Ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.
- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.
- When you judge that learners are ready, invite them to try the **tasks**. You could put extra questions to the learners during Task 1 such as finding out the distance between Earth and other planets or between different planets. Learners can find this information on the web.

In addition to the examples and tasks given in the pack, you could provide other examples and comparisons to allow learners more opportunities to practise their newly acquired skills. As well as **individual** work, learners could work in **pairs** or small **groups** to discuss their method and answers.

- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.

Tutor Guidelines for Activity N3: The solar system

- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.
- **Practice sheet N3** will give learners a chance to deepen their knowledge of scientific notation. Encourage learners to perform these calculations without using their calculator. Also encourage them to then check their answer using their calculator.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N4: Cost of construction**Activity** **Cost of construction** **N4**

This activity links to **learning outcome 1.1 and 1.3.**

Learning Outcomes

1. Use appropriate strategies including percentage error to compute the differences between approximations and actual figures.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Adding natural numbers
2. Understanding the concept of percentage error
3. Calculating percentage error
4. Recognising the relevance and usefulness of mathematics in everyday life
5. Exploring the use of mathematics in a range of contexts

Materials you will need for this activity

- Different items of food or clothing in order for you to estimate the price
- Practice Sheet N4
- Solution Sheet N4

Tutor Guidelines for Activity N4: Cost of construction

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**

Tutor Guidelines for Activity N4: Cost of construction

Guiding the learners through Activity N4

- Cost of Construction – introduce and develop the concept of percentage error through real life activities of interest to the learners.
- Recap on key learning points from the previous session.
- Explain what the learners will be able to do after this activity.
- Ask learners if they have ever had to estimate the value of something before they have seen its actual value. Facilitate thinking and discussion around estimated value and actual value and the difference between them. You could ask questions such as: How can you work out how accurate your estimate was? Are there any game shows or quizzes where you have to guess (or estimate) as close as possible to the actual value in order to win a prize? This discussion will help learners to see the kinds of situations where we might estimate values and then calculate the difference between their estimate and the actual value.
- Make sure learners understand that we **calculate the difference** between an estimate and the actual value **by using subtraction**.
- **Recap** on what we mean by the word **percentage** before introducing the **formula** for calculating percentage error. Explain why we **place the error over the actual value** before we multiply by $\frac{100}{1}$.
- When calculating percentage error we often need to **round off** our resultant percentage to the nearest whole number or to two decimal places. Refer to Activity N1 and N3 in order to recap on rounding off.

Tutor Guidelines for Activity N4: Cost of construction

- **Explain** and **demonstrate** the concepts and procedures by working through the Worked Example on the whiteboard or flipchart. Ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.
- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.
- When you judge that learners are ready, invite them to try the **tasks**.
- Task 2 is a small group task. The members of the group must bring in a number of items from home, for example, food, items of clothing or magazines. The learners must know the price of the items which they bring in. Then everybody else in the group must estimate how much each item costs. When the correct price is revealed everyone must work out their percentage error. **Alternative:** You could also do this activity with pictures of items, for example, shoes, jeans or tops. You could get the pictures and the costs of the items from catalogues (paper or on the web).
- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.

Tutor Guidelines for Activity N4: Cost of construction

- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.
- **Practice sheet N4** will give learners a chance to enhance their knowledge of calculating percentage error.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N5: Interest**Activity****Interest****N5**

This activity links to **learning outcomes 1.1 and 1.5.**

Learning Outcomes

1. Understand the concept of simple interest.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Understanding the concept of simple interest
2. Calculating simple interest using the appropriate formulae
3. Applying knowledge to real life questions including savings and credit options
4. Recognising the importance of mathematics in the world around us
5. Exploring the use of mathematics in a range of contexts

Materials you will need for this activity

- Practice Sheet N5
- Solution Sheet N5

Tutor Guidelines for Activity N5: Interest

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**

Tutor Guidelines for Activity N5: Interest

Guiding the learners through Activity N5

- Interest – introduce and develop the concept of simple interest through real life activities of interest to the learners.
- **Recap** on key learning points from the previous session. Check too that learners know **how to substitute values into formulae** and **solve equations**.
- Explain what the learners will be able to do after this task.
- Ask learners whether they have they heard of or dealt with simple interest before. Do they know of any financial institutions which offer simple interest?
- **Discuss the Simple Interest example**. Break down the question so learners can understand the concepts. Ensure they grasp the idea of earning and paying interest and the situations where both occur. Ask learners about the rates of interest being paid and earned. Would they borrow or save at that rate?
- **Explain and demonstrate** the concepts and procedures by working through the Worked Examples on the whiteboard or flipchart. In each case ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.
- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.

Tutor Guidelines for Activity N5: Interest

- After you explain and discuss the examples, ask the learners to try the **tasks** themselves. You might like them to work in pairs or small groups to discuss their answers.

- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.

- Always **ask the learners to explain their answer**, in words and in maths. The focus here is on understanding what the answer means so that when they have to make banking decisions for themselves they will be able to do so effectively. Ask learners about where they might find information about interest rates from shops or banks and why might we want to know these interest rates.

- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.

- **Facilitate learners to set tasks** for each other based on the learning from this session.

- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.

Tutor Guidelines for Activity N5: Interest

- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.
- **Practice sheet N5** allows learners to develop their skills in working with simple interest.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N6: Banking options**Activity****Banking options****N6**

This activity links to **learning outcome 1.1 and 1.5.**

Learning Outcomes

1. Understand the concept of compound interest.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Understanding the concept of compound interest
2. Calculating compound interest using the appropriate formulae
3. Differentiating between both types of interest
4. Applying knowledge to real life questions including savings and credit options
5. Recognising the relevance and use of mathematics in everyday life

Materials you will need for this activity

- Practice Sheet N6
- Solution Sheet N6

Tutor Guidelines for Activity N6: Banking options

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N6: Banking options

Guiding the learners through Activity N6

- Banking Options – introduce and develop the concept of compound interest through real life activities of interest to the learners.
- **Recap** on key learning point from the last session.
- Remind learners that for these tasks they will need to know how to use the **power button on their calculator** and **how to substitute variables** and **solve equations**.
- Explain what the learners will be able to do after this task.
- Ask learners to think and talk about what they know about compound interest. Have they encountered compound interest before? Do they know of any financial institutions which offer compound interest? Do they know of any types of compound interest?
- Talk through and discuss the Compound Interest examples. In each case break the question down so learners can understand the concepts. Make sure they grasp the idea of earning or paying interest, the different situations where both occur and the different types of compound interest.
- When moving on to compounding interest more than once in a year use discussion to encourage learners to discover what happens to the interest rate and the time.

Tutor Guidelines for Activity N6: Banking options

- Ask learners about the rates of interest being applied and the amounts of interest being paid and earned. Are they realistic? Would they save or borrow at that rate?
- Discuss the differences between simple interest and compound interest. Which type of interest would you prefer to borrow at? Would they choose simple or compounded interest? Which do they think is more profitable for the consumer?
- **Explain** and **demonstrate** the concepts and procedures by working through the Worked Examples on the whiteboard or flipchart. In each case ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.

Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.

- After you explain and discuss the examples, ask the learners to try the **tasks** themselves. You might like them to work in pairs or small groups to discuss their answers.
- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Always **ask the learners to explain their answer**, in words and in maths. The focus here is on understanding what the answer means so that when they have to make banking decisions for themselves they will be able to do so effectively. Ask learners about where they might

Tutor Guidelines for Activity N6: Banking options

find information about interest rates from shops or banks and why might we want to know these interest rates.

- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.
- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.

Tutor Guidelines for Activity N6: Banking options

- **Practice Sheet N6** allows learners to develop their skills in working with compound interest.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N7: Pay slips**Activity****Pay slips****N7**

This activity links to **learning outcomes 1.1 and 1.6.**

Learning Outcomes

1. Calculate payslips using appropriate statutory deductions.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Becoming familiar with the meaning of terminology on pay slips such as gross and net pay and how to make such calculations
2. Being able to calculate using a number of real life financial examples
3. Exploring examples of mathematics in everyday life
4. Recognising the use of mathematics in a range of contexts

Materials you will need for this activity

- Practice Sheet N7
- Solution Sheet N7

Tutor Guidelines for Activity N7: Pay slips

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N7: Pay slips

Guiding the learners through Activity N7

- **Recap** on key learning points from the last session.
- **Pay Slips** – introduce and develop the concept of pay slips and deductions through real life activities of interest to the learners.
- For the tasks in this Activity learners will need to recap how to work out **fractions and percentages**.
- Explain what the learners will be able to do after this activity.
- Talk through and discuss **wages and salaries**. Discuss the difference between **gross pay and net pay**. Have an example of a pay slip to hand: if appropriate, use one from the centre, or else download samples from the internet.
- Discuss with the learners: **tax**, tax rates, tax credits and other related issues. Explain the differences between PAYE, PRSI and USC. Ensure learners understand each of those **deductions**.
- More information about tax rates and tax credits is available at www.revenue.ie. The learner could use this web site to investigate the different rates of tax in Ireland at present.
- Clarify the idea of **commission** and **overtime**.
- **Explain** and **demonstrate** the concepts and procedures by working through the Worked Examples on the whiteboard or flipchart. In each case ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.

Tutor Guidelines for Activity N7: Pay slips

- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.
- After you explain and discuss each worked example, learners are asked to try a **task** themselves. You might like them to work in pairs or small groups to discuss their answers. The focus here is on understanding what the answer means so that they can understand any payslips they get or have to create.
- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.
- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.

Tutor Guidelines for Activity N7: Pay slips

- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.

- **Practice Sheet N7** allows learners to develop their skills in calculating pay slips.

- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.

- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.

- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N8: Profit or loss**Activity****Profit or loss****N8**

This activity links to **learning outcomes 1.1 and 1.6.**

Learning Outcomes

1. Calculate gross and net profit.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Becoming familiar with the meaning of terminology such as gross and net profit and how to make such calculations
2. Being able to calculate using a number of real life financial examples
3. Exploring examples of mathematics in everyday life
4. Recognising the importance of mathematics in the world around us

Materials you will need for this activity

- Practice Sheet N8
- Solution Sheet N8

Tutor Guidelines for Activity N8: Profit or loss

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N8: Profit or loss

Guiding the Learners through Activity N8

- **Profit or loss** – introduce and develop the concept of gross and net profit or loss through real life activities of interest to the learners.
- **Recap** on key learning points from the last session.
- For the tasks in this Activity learners need to know how to work with **fractions, percentages**, their **calculator** and **net and gross pay**.
- Explain what the learners will be able to do after this activity.
- Discuss what the learners already know about profit and loss accounts. Explain that this section looks at simple profit and loss accounts: there are more complicated versions.
- Talk through and discuss the profit and loss Worked Examples. Discuss the different types of operating costs that different occupations might have.
- **Explain and demonstrate** the concepts and procedures by working through the Worked Examples on the whiteboard or flipchart. In each case ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.
- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.
- After you explain and discuss each example, learners are asked to try **Tasks** themselves. You might like them to work in pairs or small groups to discuss their answers. Always ask the learners to explain their answers, verbally and mathematically.

Tutor Guidelines for Activity N8: Profit or loss

- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.
- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.
- **Practice Sheet N8** allows learners to develop their skills in working with profit and loss.

Tutor Guidelines for Activity N8: Profit or loss

- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N9: the transfer window**Activity The transfer window N9**

This activity links to **learning outcomes 1.1 and 1.6.**

Learning Outcomes

1. Calculate profit and loss on goods sold.
2. Explain how mathematics can be used to enable the individual function more effectively as a person and as a citizen.

Key Learning Points

1. Understanding common mathematical terms associated with buying and selling goods
2. Being able to calculate using a number of real life financial examples
3. Exploring examples of mathematics in everyday life
4. Recognising the use of mathematics in a range of contexts

Materials you will need for this activity

- Practice Sheet N9
- Solution Sheet N9

Tutor Guidelines for Activity N9: the transfer window

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**.

Tutor Guidelines for Activity N9: the transfer window

Guiding the learners through Activity N9

- The Transfer Window – introduce and develop the concept of **percentage profit and loss** using real life activities of interest to the learners.
- Explain what the learners will be able to do after this activity.
- **Recap** on key learning points from the last session.
Recap what is meant by the terms profit and loss. Have the learners ever made profits or losses when buying or selling goods? How would you calculate profit or loss?
- Ensure learners know how to calculate the profit or loss, by subtraction. Then recap again on what we mean by the word percentage before introducing the formula. Remind learners why the profit or loss is placed over the cost price before we multiply by $\frac{100}{1}$.
- Remind learners that when calculating percentage profit or loss we are often required to **round off** the resultant percentage to the nearest whole number or to two decimal places.
- **Explain** and **demonstrate** the concepts and procedures by working through the Worked Examples on the whiteboard or flipchart. In each case ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.
- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it means.

Tutor Guidelines for Activity N9: the transfer window

- When you explain and discuss the Worked Example learners should try the **Tasks** themselves. You might like them to work in small groups to discuss their answers. The focus here is on understanding what the answer means and explaining it mathematically and verbally.
- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.
- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms. Encourage learners to keep a **personal dictionary**.
- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words

Tutor Guidelines for Activity N9: the transfer window

throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.

- **Practice sheet N9** will give learners a chance to enhance their knowledge of calculating percentage profit or loss on products or services sold. You should encourage learners to perform these calculations without using their calculator but they should also be asked to then check their answer using their calculator.
- **At the end of the session** sum up the key learning points and say what the main focus of the next session will be.
- Facilitate learners to **evaluate** the session: what they found useful, what they found difficult and what they would like to do next.
- Use their feedback to inform your **planning** for the next session.

Tutor Guidelines for Activity N10: Value Added Tax**Activity****Value Added Tax****N10**

This activity links to **learning outcomes 1.1 and 1.6.**

Learning Outcomes

1. Calculate VAT inclusive and VAT exclusive prices.
2. Explain how mathematics can be used to enable the individual more effectively as a person and as a citizen.

Key Learning Points

1. Calculating percentages
2. Developing an understanding of what VAT is
3. Calculating VAT
4. Recognising the relevance and usefulness of mathematics in the world around us

Materials you will need for this activity

- Receipts from recent shopping trips.
- Practice Sheet N10
- Solution Sheet N10

Tutor Guidelines for Activity N10: Value Added Tax

Before the session

- Read through the relevant section in the Learner Pack. **Try out the exercises.**
- Notice **mathematical words and concepts** that may be new or unfamiliar to your learners. Record those as part of developing a **glossary** for this module. Record any other words from this section of the Learner Pack that you think may be new to your learners, or that might have a different meaning to the one they are familiar with.
- **Plan how you will introduce and explain these key words** and concepts in this session or over a number of sessions. Plan to **facilitate learners to**
 - say where they have met these words before and how they understand them from that experience;
 - link the new learning to that experience;
 - understand that a word can have different meanings in different contexts; and
 - be able to explain the meaning of the words in the maths context .
- Plan to involve learners in **using** those key words frequently. For example, learners could take part in focused discussions; in making brief presentations on what they have learned; in using the internet to search for explanations and illustrations of the key words.
- Plan to use a **few different methods and materials**– visual, auditory and kinaesthetic or tactile – to appeal to the different learning styles in your group. Learners could create and use quizzes, games, wordwalls, worksheets, or make mindmaps, flowcharts, images or 3-D models of the concepts and procedures. Plan to encourage learners to use the appropriate maths language as they work together on these and other tasks.
- The Learner Pack Activities are **examples**. Try to use topics that relate to your learners' experience, interests, needs and aspirations. Consult with learners and colleagues to **link the maths learning with relevant topics from learners' other subjects and activities**

Tutor Guidelines for Activity N10: Value Added Tax

Guiding the learners through Activity N10

- **Value Added Tax** – introduce and develop the concept VAT through real life activities of interest to the learners.
- **Recap** on key learning points from the last session.
- Explain what the learners will be able to do after this activity.
- Facilitate learners to **say what they already know** about VAT. Do they know what the abbreviation stands for? Check that they know how to calculate tax amounts.
- Discuss **the different rates of VAT** for different goods and services in Ireland. Learners could look up the different rates at <http://www.revenue.ie/en/tax/vat/rates/current-historic-rates-vat.html>.
- Discuss the difference between **VAT inclusive** and **VAT exclusive** prices. Highlight that in Ireland prices are generally VAT inclusive but this is not always the case in other countries. For example, in the United States prices are quoted excluding VAT.
- **Explain** and **demonstrate** the concepts and procedures by working through the Worked Examples on the whiteboard or flipchart. In each case ask learners to **talk you through** the steps, with reference to their pack. Use focused questioning to check understanding at each stage.
- Go through the example again if you think it would be helpful. This time **ask the learners to write each step** and as they write to **say** what it

Tutor Guidelines for Activity N10: Value Added Tax

means.

- When you have explained and discussed each Worked Example learners should try the **Tasks** themselves. You might like them to work in small groups to discuss their answers. The focus here is on understanding what the answer means and explaining it mathematically and verbally. In Task 3, learners must find **receipts** from recent purchases and work out the rate of VAT that was applied. Learners can also work out how much the goods would have cost if they did not have to pay any VAT.
- **Monitor and support** learners as they carry out the tasks. Encourage **questions** and **focused discussion**. The learners should check and confirm their answers using the **calculators**.
- Give learners **feedback** on the tasks they have done. Highlight the procedures and understandings that they correctly applied, helping them to **reinforce the key learning points** involved. Help them to identify any errors and to notice the key learning points involved in those. Then help them to **plan** what they could do next to build on the learning from the tasks they have just completed.
- **Facilitate learners to set tasks** for each other based on the learning from this session.
- **Encourage learners to summarise** what they have learned: to express it verbally and by creating mind-maps or flowcharts or 3-d models or other aids. Learners can work individually and/or in pairs or threes to make these.
- Facilitate the group to build a **group glossary** of mathematical terms.

Tutor Guidelines for Activity N10: Value Added Tax

- Encourage learners to keep a **personal dictionary**.

- If you think it would be helpful to your group: Make, or encourage the group to make, a **wordwall** displaying the key terms, the definitions you and the learners have agreed and any related images that learners decide would be helpful. Learners can use this display as a resource for checking meaning and spelling as required. **Change** the words throughout the module according as learners become familiar with them and as you introduce new topics, terms and concepts.

- **Practice Sheet N10** will give learners a chance to enhance their knowledge of calculating VAT. You should encourage learners to perform these calculations without using their calculator. Also ask them to check their answer using their calculator.

- **At the end of the session** sum up the key learning points.

- Facilitate learners to **evaluate** the session.

- **At the end of Unit 1**, facilitate learners to evaluate the unit. Use their feedback to inform your planning for the next time you facilitate this unit.

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