JOB READY

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JOBREADY FRAMEWORK

MODULE 7

Numeracy for the hospitality industry

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Module 7: Numeracy for the hospitality industry

I. Module Overview

In this module, learners are introduced to the basic modalities of numeracy in the hospitality industry. They are familiarised with relevant everyday key figures and calculation principles in the hospitality industry. Based on practising numeric operations, they gain a practice-oriented insight into the organisation and creation of duty rosters, seating plans and menus/dishes, the exchange of currency and more, sustainable and resource-saving use of electricity and water.

Business Communication		Duration (Hours)
Classroom-based Learning	Content Delivery	10
	Individual Work	4
	Assessment	1
Theoretical and Practical Learning		Implemented in a VET setting simulating practice environment

II. Learning Units Overview

Learning Units	Duration (Hours)
LU7.1 – Time calculations	1
LU7.2 – Cost calculations	1
LU7.3 – Maths in food/drink portioning	1
LU7.4 – Ratios in the hospitality context	1

LU7.5 – Numbers and calculations in rostering	1
LU7.6 – Numbers and dimensions for seating plan preparation	1
LU7.7 – Arithmetical operations for preparing a set menu and a buffet	1
LU7.8 – Practicing arithmetical operations for cleaning tasks in the hospitality industry	1
LU7.9 – Practicing currency exchange	1
LU7.10 – Electricity, water, heating – energy consumption and related measurements	1

1. Learning Unit 7.1: Time calculations

• *Learning Unit Description*

This unit introduces learners to various key performance metrics in the hospitality industry and explores with them what they mean and their measurement.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.1 Recall time calculations in the hospitality industry	7.1.1 Key performance metrics in the hospitality industry and their measurement 7.1.2 Average daily rate (ADR) 7.1.3 Occupancy rate 7.1.4 Revenue Per Available Room (RevPAR) 7.1.5 Average length of stay (ALOS)	1

- Learning Outcome 7.1 - Activities and Reference Sheets
  - LO7.1 Elaborating time calculations in the hospitality industry

Learning objective	7.1.1 Overview: Key performance metrics in the hospitality industry and their measurement

Key Performance Metrics, also known as Key Performance Indicators (KPIs), are quantifiable measures used to evaluate the success or performance of an organisation, business, or specific activity. Key performance metrics in the hospitality industry are essential for monitoring business performance,

identifying areas of improvement, and making informed decisions to drive profitability and guest satisfaction.

In the hospitality industry, some common Key Performance Metrics include Occupancy Rate, Average Daily Rate (ADR), Revenue per Available Room (RevPAR), Average Length of Stay, Customer Satisfaction Scores, Return on Investment (ROI), Employee Turnover Rate, and Food and Beverage Cost Percentage.

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Reference Sheet 7.1.1.a: Key performance metrics for accommodation providers

Average daily rate (ADR): This metric calculates the average revenue earned per occupied room in a hotel. It is calculated by dividing the total room revenue by the number of rooms sold.

Occupancy rate: This metric measures the percentage of hotel rooms that occupied during a specific period. It is calculated by dividing the number of rooms sold by the total number of rooms available.

Revenue per available room (RevPAR): This metric measures the total revenue generated per available room in a hotel. It is calculated by multiplying the ADR by the occupancy rate.

Average length of stay: This metric measures the average number of nights a guest stays at a hotel. It can help determine the effectiveness of marketing and service offerings in encouraging longer stays.

Cost per Occupied Room (CPOR): This KPI calculates the total cost associated with each occupied room, including expenses such as housekeeping, maintenance, utilities, and amenities. It helps in monitoring operational costs per room.

Gross Operating Profit per Available Room (GOPPAR): This metric calculates the profitability of each available room after deducting all operating expenses. It provides a comprehensive view of the hotel's financial performance.

Customer Acquisition Cost (CAC): This metric calculates the average cost incurred to acquire a new customer. It includes marketing and sales expenses and is essential for evaluating the effectiveness of marketing campaigns.

Customer satisfaction score: This metric measures a guest's overall satisfaction with their stay at a hotel. It is usually determined through post-stay surveys or online reviews.

Net promoter score (NPS): This metric measures the likelihood that guests will recommend a hotel to others. It is calculated based on

Reference Sheet 7.1.1.b: Key performance metrics for Food & Beverage providers

Table Turnover Rate: This KPI is used in restaurants to measure the number of times tables are cleared and re-seated within a specific period. It helps assess the efficiency of service and revenue generation.

Revenue per Available Seat Hour (RevPASH): This metric is used in restaurants to measure the revenue generated per available seat hour. It helps assess the efficiency of restaurant operations and seating capacity utilisation.

Food Cost Percentage: This KPI measures the cost of food ingredients as a percentage of total food sales. It helps assess the profitability of the menu items and control food costs.

Average Customer Wait Time: This KPI measures the average time customers wait to be seated or served. It helps in improving service efficiency and customer experience.

Reservation No-Shows: This metric tracks the number of reservations that do not show up. It helps in managing table allocation and optimising restaurant capacity.

Menu Item Performance: Checking the sales performance of

Learning objective	7.1.2 Average daily rate (ADR)

The Average Daily Rate (ADR) is a key performance indicator commonly used in the hospitality industry to measure the average revenue earned per room per day. It is calculated by dividing the total room revenue generated by the number of rooms sold during a specific period.

ADR = Total Room Revenue / Number of Rooms Sold

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Reference Sheet 7.1.2.a: About the ADR

The ADR directly impacts a hotel's revenue generation, as it reflects the average price guests are paying for a room. By monitoring ADR, you can understand their pricing strategy's effectiveness and adjust rates to optimise revenue.

ADR serves as a benchmark to compare a hotel's pricing strategy and performance against competitors in the market. It helps in assessing market positioning and identifying pricing opportunities.

ADR plays a crucial role in determining a hotel's profitability. By increasing ADR while maintaining occupancy rates, a hotel can improve revenue and profit margins.

Reference Sheet 7.1.2.b: Possibilities if the ADR is too low

Rate Adjustments: Reviewing and adjusting room rates based on demand, seasonality, and market conditions can help increase ADR. Implement dynamic pricing strategies to maximise revenues during peak periods.

Upselling and Cross-selling: Encouraging guests to upgrade rooms or purchase additional services and amenities can increase the average spend per guest, thereby boosting ADR.

Revenue Management: Implementing effective revenue management strategies, such as setting minimum-stay requirements, managing distribution channels, and optimising room pricing, can help maximise ADR.

Enhanced Guest Experience: Providing exceptional service, personalised experiences, and value-added amenities can justify higher room rates and increase ADR through guest satisfaction and loyalty.

Promotions and Packages: Offering attractive packages,

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Activity 7.1.2: Calculate the ADR

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Exercise 1:
Hotel Alpha had a total room revenue of $ 15,000 for June. During the same period, they sold 300 rooms. Calculate the ADR for the hotel in June.

Exercise 2:
Hotel Beta generated a total room revenue of € 20,000 in March. They sold a total of 150 rooms during the same month. Calculate the ADR for Hotel Beta in March.

Exercise 3:
Hotel Charleston had a total room revenue of € 12,500 for the week of a major local event. During that week, they sold a total of 50 rooms. Calculate the ADR for Hotel Charleston for that week.

Exercise 4:
Hotel Delta recorded a total room revenue of $ 25,000 for the weekend of a music festival. They sold a total of 100 rooms during the same period. Calculate the ADR for Hotel Delta for that weekend.

Exercise 5:
Hotel Emilio had a total room revenue of € 18,000 for a holiday weekend. They sold a total of 60 rooms during that weekend. Calculate the ADR for Hotel Emilio for the holiday weekend.

Answer Key:

1. ADR for Hotel A in June = $ 15,000 / 300 = $ 50
2. ADR for Hotel B in March = € 20,000 / 150 = € 133.33

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Reference Sheet 7.1.2.c: Reminder of basic arithmetic operations

Addition: Addition is the operation of combining two or more numbers to find their total sum. In an addition problem, the numbers being added are called addends, and the result is called the sum. For example, in the addition problem, 3 + 5 = 8, 3 and 5 are the addends, and 8 is the sum.

Subtraction: Subtraction is the operation of taking one number away from another to find the difference between them. In a subtraction problem, the number being subtracted is called the subtrahend, the number it is subtracted from is called the minuend, and the result is called the difference. For example, in the subtraction problem, 10 - 4 = 6, 4 is the subtrahend, 10 is the minuend, and 6 is the difference.

Multiplication: Multiplication is the operation of repeated addition, where two or more numbers are combined to find their total product. In a multiplication problem, the numbers being multiplied are called factors, and the result is called the product. For example, in the multiplication problem, 3 x 4 = 12, 3 and 4 are the factors, and 12 is the product.

Division: Division is the operation of partitioning a number into equal parts or groups to find out how many times one number is contained within another. In a division problem, the number being divided is called the dividend, the number it is divided by is called the divisor, and the result is called the quotient. For

Learning objective	7.1.3 Occupancy rate

The occupancy rate provides valuable insights into the operational and financial health of a property. A higher occupancy rate indicates that a larger percentage of available rooms were sold, while a lower occupancy rate suggests that a smaller percentage of rooms were sold. It helps understand how effectively a hotel is filling its available rooms and understand its position in the market relative to competitors.

Hoteliers should calculate the occupancy rate regularly, such as on a daily, weekly, monthly, or yearly basis, depending on the reporting and analysis requirements. Daily occupancy rates can provide real-time insights into performance, while monthly or yearly rates help in long-term planning and trend analysis. To compare the occupancy rate, you can benchmark the performance against industry standards, competitors, or historical data.

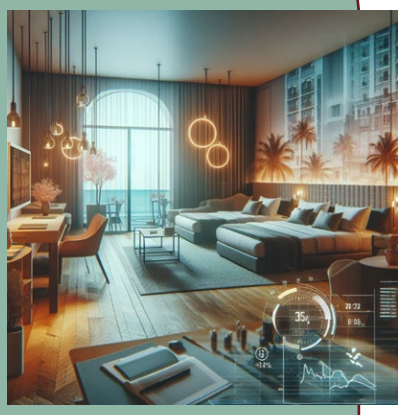
Reference Sheet 7.1.3.a: Occupancy rate

For example, let's say a hotel sold 80 out of its 100 available rooms on a particular day. To calculate the Occupancy Rate you have Number of rooms sold = 80, Number of available rooms = 100 and apply the following formula:

Occupancy Rate = (80 / 100) x 100

Occupancy Rate = 0.8 x 100

Occupancy Rate = 80 %



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In this scenario, the hotel's Occupancy Rate for that day would be 80 %. This means that 80 % of the available rooms were occupied by guests. A higher Occupancy Rate generally indicates better performance and revenue generation for the hotel.

Reference Sheet 7.1.3.b: Needed data to calculate the Occupancy Rate

The total number of rooms sold (occupied rooms) during a specific time (e.g., a day, week, month).

The total number of available rooms during the same time.

The formula to calculate the Occupancy Rate is Occupancy Rate = (Number of Rooms Sold / Number of Available Rooms) x 100

Activity 7.1.3: Calculate the Occupancy Rate

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Exercise 1:
Number of rooms sold: 75
Number of available rooms: 100

Exercise 2:
Number of rooms sold: 90
Number of available rooms: 120

Exercise 3:
Number of rooms sold: 60
Number of available rooms: 80

Exercise 4:
Number of rooms sold: 110
Number of available rooms: 150

Exercise 5:
Number of rooms sold: 45
Number of available rooms: 60

Answer Key:

Learning objective	7.1.4 Revenue Per Available Room (RevPAR)

The indicator "Revenue Per Available Room" (RevPAR) is a key performance metric commonly used in the hospitality industry to evaluate the hotel's overall financial performance and efficiency in generating revenue from available rooms. RevPAR takes into account both the occupancy rate and the average daily rate (ADR) to provide a comprehensive picture of how well a hotel is utilising its room inventory to generate revenue. A higher RevPAR indicates that the hotel is achieving higher revenue from its available rooms, whether by increasing occupancy rates, average room rates, or both.

Reference Sheet 7.1.4: Formula to calculate the RevPAR

RevPAR = Total Room Revenue / Number of Available Rooms

Total Room Revenue: This represents the total revenue generated from room sales during a specific period, such as a day, week, or month. It includes revenue from room rates, additional services or amenities related to room bookings, and any room package deals.

Activity 7.1.4: Calculate the Revenue Per Available Room (RevPAR)

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Exercise 1:
A hotel generated € 40,000 in total room revenue and had 100 rooms available for sale during the month.

Exercise 2:
A boutique hotel had € 25,000 in total room revenue and 50 rooms available for sale during a specific week.

Exercise 3:
A resort generated € 75,000 in total room revenue over a weekend and had 150 rooms available for sale

Exercise 4:
A chain of hotels had a total room revenue of € 150,000 for the month and had 300 rooms available for sale.

Answer Key:

Learning objective	7.1.5 Average length of stay (ALOS)

The Average Length of Stay (ALOS) is another key performance metric used in the hotel industry to measure the average number of nights that guests stay at the hotel. It is calculated by dividing the total number of room nights sold by the total number of bookings or guests during a specific period. By understanding the average length of stay of guests, hoteliers can adjust pricing strategies, promotions, and availability to maximise revenue. It can also help you forecast demand, allocate resources effectively, and optimise staffing levels (e.g. plan housekeeping schedules, manage inventory, and provide a personalised guest experience based on the length of stay).

Reference Sheet 7.1.5: Formula to calculate the ALOS

ALOS = Total Room Nights Sold / Total Number of Bookings or Guests

Activity 7.1.5: Calculate the Average Length of Stay (ALOS)

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Exercise 1:
A hotel had a total of 500 room nights sold and 100 bookings in a month.

Exercise 2:
A resort had a total of 800 room nights sold and 200 guests in a week.

Exercise 3:
A boutique hotel had a total of 300 room nights sold and 75 bookings over a weekend.

Exercise 4:
A chain of hotels had a total of 1200 room nights sold and 300 bookings in a month.

Answer Key:

1. ALOS = 5 nights

2. Learning Unit 7.2: Cost calculations

• *Learning Unit Description*

In this learning unit, learners find out which fixed and variable costs are commonly used in the hospitality industry. They look at examples aimed at helping reduce hotel operating costs. They learn from examples managing price calculations for different posts/ departments in the industry.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.2 Explain and demonstrate how to handle cost calculations in the hospitality industry	7.2.1 Operating costs in the hospitality industry: fixed and variable costs 7.2.2 Planning of hotel operating costs (covering different departments/ posts) 7.2.3 Example calculation of prices for accommodation providers	1

- Learning Outcome 7.2 - Activities and Reference Sheets
  - LO7.2 Handle cost calculations in the hospitality industry

Learning objective	7.2.1 Operating costs in the hospitality industry: fixed and variable costs

Fixed and variable costs are two fundamental categories of expenses that businesses encounter in their operations. Fixed costs are constant expenses that do not vary with output levels, while variable costs fluctuate based on business activity. Understanding and effectively managing both fixed and

variable costs is crucial for businesses to maintain profitability and make informed financial decisions.

Reference Sheet 7.2.1.a: Fixed costs

Fixed costs are expenses that remain constant regardless of the level of sales. These costs do not fluctuate with changes in the business activity.

Examples of fixed costs include rent for a facility, property taxes, insurance premiums, salaries of permanent employees, or certain administrative expenses.

Fixed costs are incurred by a business even if it produces nothing or sells no products/services during a particular period.

Since fixed costs do not change with production levels, they are

Reference Sheet 7.2.1.b: Variable costs

Variable costs are expenses that change in direct proportion to the level of sales of goods/services. These costs fluctuate with business activity.

Examples of variable costs include raw materials, direct labour wages, utility costs that increase with production output, or sales commissions based on revenue.

Variable costs are directly linked to the volume of output; as production increases, variable costs also rise accordingly.

Variable costs are typically controllable, meaning they can be adjusted or reduced by management decisions like sourcing cheaper materials or improving efficiency in production

Activity 7.2.1: Find the fixed and the variable costs

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 10 min. time for the task.

Step 2: After 10 min., discuss the result in group to solve the task.

Instructions:

Scenario: *Desert production in your hotel*

For your hotel, you have recently opened your own desert production. You produce deserts and sell a variety of delicious baked goods to your guests. The business operates from a rented storefront and has a team of bakers who create the products. Let's look at the costs incurred and determine whether they are fixed or variable.

Please categorise the following costs as either fixed or variable:

- Rent for the bakery storefront
- Cost of flour and sugar for baking
- Salary of the head baker
- Packaging supplies for the baked goods
- Electricity bill for operating baking equipment
- Property taxes for the bakery premises
- Commission paid to sales staff based on sales revenue
- Insurance premiums for the bakery business

Answer Key:

Learning objective	7.2.2 Planning of hotel operating costs (covering different departments)

Operating costs, also known as operating expenses, are the ongoing expenses that a business incurs as part of its day-to-day operations. These costs are necessary to keep the business running and to generate revenue. Operating costs are different from one-time expenses, such as purchasing new equipment or renovating a building, which are considered capital expenditures. Capital expenditures are investments made by a business in long-term assets, such as property, equipment, or infrastructure, that are expected to provide benefits over multiple accounting periods.

Managing and controlling operating costs is crucial for a business to remain profitable and sustainable in the long run. Monitoring these expenses regularly can help businesses identify cost-saving opportunities and make strategic decisions.

Reference Sheet 7.2.2.a: Typical operating expenses

Payroll and Employee Benefits: Salaries, wages, bonuses, commissions, health insurance, retirement contributions, and other expenses related to employees.

Rent or Lease Payments: The cost of leasing or renting office space, retail space, warehouses, or other facilities needed for the business operations.

Utilities: The costs of electricity, water, gas, internet, and other utilities necessary for the business to function.

Supplies and Materials: Expenses related to purchasing office supplies, inventory, raw materials, and any other materials needed for production or service delivery.

Maintenance and Repairs: Expenses for maintaining and repairing equipment, machinery, vehicles, buildings, and other assets used in the business.

Insurance: Premiums for business insurance policies, such as property insurance, liability insurance, workers' compensation insurance, and other coverage needed to protect the business.

Taxes and Licenses: Business taxes, license fees, permit fees, and other regulatory costs incurred to operate legally.

Marketing and Advertising: Costs associated with promoting the business, including advertising campaigns, social media marketing, website development, and other marketing efforts.

Professional Services: Fees for accounting, legal, consulting, or other professional services necessary for the business.

Depreciation: The allocation of the cost of assets over their

Reference Sheet 7.2.2.b: Planning operating costs

Budgeting: Develop a detailed budget that outlines projected revenues, expenses, and profitability goals. Allocate funds strategically to different departments based on their needs and priorities. Regularly review and adjust the budget as needed to stay on track and respond to changing market conditions.

Cost Control Measures: Implement cost control measures to monitor and manage operating expenses effectively. This could include setting spending limits, negotiating contracts with vendors, implementing energy-saving initiatives, and reducing waste.

Benchmarking: Compare your operating costs to industry benchmarks and key performance indicators (KPIs) to identify areas where costs are higher than average. Use this information to make informed decisions on where cost-saving opportunities exist and where improvements can be made.

Regular Financial Analysis: Conduct regular financial analysis to track operating costs, revenue trends, and profitability

Individual Work Assignment 1: Additional considerations

Materials: paper and pen, PC/tablet for online research

Find out more strategies and good practices, a hospitality business can use to effectively plan operating costs. You may consider general measures like the following:

Energy Efficiency: Implement energy-saving initiatives, such as installing energy-efficient lighting, HVAC systems, and water-saving devices. Monitor and analyse utility usage to identify areas for improvement and reduce energy costs.

Vendor Management: Negotiate favourable terms with suppliers and vendors to secure competitive pricing, discounts, or rebates. Regularly evaluate supplier performance and consider alternative vendors if

Activity 7.2.2: Which of the following costs in the department of an accommodation provider are operating costs?

Materials: paper and pen

Steps:

Step 1: Hand out the instructions and give learners 10 min. time to solve the task.

Step 2: Collate the results to correct results.

Instructions:

Department: Housekeeping

- Cost: Housekeeping Labour and Supplies
- Housekeeping labour costs for cleaning rooms, common areas, and laundry services
- Cleaning supplies, detergents, amenities, and linens
- Maintenance and replacement costs for equipment and machinery

Department: Food and Beverage

- Cost: Food and Beverage Inventory and Staffing
- Cost of purchasing food, beverages, and supplies for the restaurant and bar
- Labour costs for kitchen staff, servers, bartenders, and other F&B team members
- Operational expenses for kitchen equipment, maintenance, and cleaning supplies

Department: Front Office

- Cost: Front Office Operations and Customer Service
- Staffing costs for receptionists, concierge, reservation agents, and guest services personnel

Learning objective	7.2.3 Example calculation of prices for accommodation providers

The choice of pricing strategy for accommodation providers can have a significant impact on revenue generation, profitability, and competitive positioning in the market. It is essential to consider the unique characteristics of the business, target market dynamics, and industry trends when determining the most effective pricing approach for sustainable success. The following examples are based on generic assumptions but should help to understand you need to look into your individual case for a good price calculation.

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Example 7.2.3.a: Strategies for Prices of a Small Bed and Breakfast (B&B)

Good Reason: Cost-Plus Pricing

The small B&B owner calculates the price for each room by adding a mark-up percentage on top of the total cost of providing the accommodation, including overhead costs and desired profit margin. This method is straightforward and ensures that all costs are covered while generating a profit.

Not-So-Good Practice: Competitor-Based Pricing

The B&B owner sets prices based on what competitors in the area are charging, without considering their unique value proposition or cost structure. This approach may result in underpricing or overpricing of the rooms, leading to potential revenue loss or missed profitability opportunities.

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Example 7.2.3.b: Calculation of Prices for a Large Hotel

Good Reason: Dynamic Pricing

The large hotel uses dynamic pricing strategies to adjust room rates based on demand, seasonality, and other factors in real time. By leveraging data analytics and revenue management tools, the hotel can optimise pricing to maximise revenue and occupancy rates.

Not-So-Good Practice: Cost-Plus Pricing

The large hotel relies solely on cost-plus pricing to determine room rates, without considering fluctuating market conditions or

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Example 7.2.3.c: Calculation of Prices for a Luxury Hotel Chain

Good Reason: Value-Based Pricing

The luxury hotel chain employs value-based pricing by setting room rates based on the perceived value of its upscale amenities, services, and brand reputation. This approach allows the hotel to capture higher price points from affluent guests who are willing to pay premium rates for a luxurious experience

Not-So-Good Practice: Penetration Pricing

The luxury hotel chain adopts a penetration pricing strategy by initially offering room rates at a low price to attract guests and gain market share. While this strategy may attract budget-

3. Learning Unit 7.3: Maths in food/drink portioning

• *Learning Unit Description*

The correct portioning of meals and food is an important cost factor in the hospitality industry. The unit helps in understanding the different measurement units and calculating food and its costs, use the appropriate measurements and units, calculating price ranges, etc.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.3 Use arithmetic operations for portioning in the hospitality industry	7.3.1 Measurements/units used for food and drinks 7.3.2 F&B portions, ingredients, calories, costs 7.3.3 Numeracy Practice Examples in F&B	1

• Learning Outcome 7.3 - Activities and Reference Sheets

- LO7.3 Using arithmetic operations for portioning in the hospitality industry

Learning objective	7.3.1 Measurements/units used for food and drinks

The following measurements and units are commonly used in Europe for portioning food and drinks, managing inventory, and ensuring consistency in culinary and beverage operations. Understanding and using the appropriate units for food and drinks is essential for maintaining quality standards, controlling costs, and providing guests with a satisfying dining experience.

Reference Sheet 7.3.1.a: Measurements/units for F&B

Volume:
- Millilitre (ml)
- Litre (l)
- Centilitre (cl)

Weight:
- Gram (g)
- Kilogram (kg)

Count:
- Each (ea)
- Dozen (dz)
- Gross (gr)

Length:
- Millimetre (mm)
- Centimetre (cm)
- Meter (m)

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Unit of Measurement for Drinks:
- Millilitre (ml)
- Centilitres (cl)
- Litre (l)
- Bottle
- Glass
- Shot
- A pint/ an imperial pint (is equal to 568 millilitres)

Reference Sheet 7.3.1.b: Specific measurements

Some specific measurements in recipes might be: Teaspoon (tsp) – around 5 millilitres (mL) of liquid or about 4.9 grams of solid ingredients; Tablespoon (tbsp) - equivalent to 15 millilitres (mL) of liquid or about 14.2 grams of solid ingredients.

"Mass" is equivalent to 1 litre of beer as a common measurement in Germany, Switzerland, and Austria at beer gardens or during Oktoberfest (a beer festival held originally in Munich, Germany, annually end of September till the first weekend of October, nowadays celebrated in many cities and countries worldwide)

Learning objective	7.3.2 F&B portions, ingredients, calories, costs

Restaurants strive to provide a balanced and visually appealing plate presentation. They traditionally use portion sizes. They may have their own portion size guidelines and considerations based on their menu offerings, target clientele, and culinary style. Portion sizes refer to the amount of food or drink served in a single meal or snack. They are important for menu items to ensure consistency and quality, but also for planning and cost control. For customers in menu descriptions, portion sizes will help calculate nutritional details like calories. Calories are a measure of the energy content in foods and beverages. Proper portion control plays a crucial role in promoting health and nutrition. By offering reasonable portion sizes, F&B businesses can help customers manage their caloric intake.

Activity 7.3.2.a: Calculate calories and costs for a menu

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

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Context description:

You are planning to put a new dish, grilled chicken salad, on the menu. You have the following ingredients list you need to purchase. Calculate the purchase price and the calories for one portion.

Your ingredients list for one portion of grilled chicken salad is:

Chicken breast (200 grams): €5 per kilogram, 165 calories per 100 grams
Lettuce (100 grams): 1 € per head (300 grams), 15 calories per 100 grams
Cherry tomatoes (50 grams): €3 per kilogram, 18 calories per 100 grams
Cucumber (50 grams): 2 € per kilogram, 16 calories per 100 grams
Olive oil (10 grams): 10 € per litre, 120 calories per 10 grams
Balsamic vinegar (5 grams): 8 € per litre, 5 calories per 5 grams

Task description:

What you need to do now is:

1. Calculate the purchase price for each ingredient based on the given prices and quantities.
2. Calculate the total purchase price for one portion of the grilled chicken salad.
3. Calculate the total calories for one portion of the grilled chicken salad.
4. Fill in the table above.

Answer key:

The purchase price for each ingredient:

Chicken breast (200 grams):
200 grams × (5 € / 1000 grams) = 1 €

Lettuce (100 grams):
100 grams × (1 € / 300 grams) = 13 € ≈ 1 €/3 = 0.33 €

Cherry tomatoes (50 grams):
50 grams × (3 € / 1000 grams) = 0.15 €

Cucumber (50 grams): 50 grams × (2 € / 1000) grams = 0.10 €

Olive oil (10 grams): 10 grams × (10 € / 1000) grams = 0.10 €

Balsamic vinegar (5 grams):
5 grams × (8 € / 1000 grams) = 0.04 €

Total purchase price for one portion:

1 + 0.33 + 0.15 + 0.10 + 0.10 + 0.04 = 1.72

Total calories for one portion:

Chicken breast (200 grams):
200 grams × (165 calories / 100 grams) = 330 calories

Lettuce (100 grams):
100 grams × (15 calories / 100 grams) = 15 calories

Cherry tomatoes (50 grams):
50 grams × (18 calories / 100 grams) = 9 calories

Activity 7.3.2.b: Multiplication exercise

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 5 min and ask one of them to present the result then.

Instructions:

Context description:

Imagine your restaurant has got a group reservation at short notice and you need to plan for 14 people. Calculate the purchase price and the calories per portion using the details from the activity described as "Activity 1: Calculate calories and costs for a menu".

Individual Work Assignment 2: Your favourite dish

To practice more, plan a full menu: starter, main dish and dessert, as well as a drink to accompany each course. Use two offers: a luxury wine and a cheaper alternative to it. Check prices at the nearest supermarket and market and get to know the purchase price, and the calories of each dish for your meal. Be inspired by the table used in "7.3.2.a: Calculate calories and costs for a menu".

Present the calculation result in class.

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Learning objective	7.3.3 Numeracy Practice Examples in F&B

This unit is to use your real-life environment as a practice field. Take at least three of the examples to perform and improve your numeracy skills.

Individual Work Assignment 3: Practice example settings

Materials: paper and pen, calculator

Calculating Inventory Levels: Practice calculating inventory levels by tracking the quantities of ingredients or products in stock, recording any additions or deductions, and calculating the total inventory at the end of the day, week, or month. This exercise helps you improve numerical accuracy and inventory management skills.

Recipe Scaling: Practice scaling recipes up or down by adjusting ingredient quantities based on different serving sizes or portions. This exercise helps you enhance numeracy skills by understanding proportions and ratios while maintaining recipe consistency.

Cost Analysis: Practice calculating costs and profits by analysing food and beverage prices, ingredient costs, overhead expenses, and profit margins. This exercise helps improve financial literacy and decision-making skills in managing costs and maximising revenues.

Tip Calculation: Practice calculating tips and gratuities

4. Learning Unit 7.4: Ratios in the hospitality context

• *Learning Unit Description*

In this learning unit, various key ratios used in the hospitality sector will be practised. They may be used to accurately analyse the performance in individual departments of a hospitality company, or used to show what the focus of activities is, where most money is spent etc.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.4: Recall ratios in the hospitality context	7.4.1 Key ratios used in the hospitality sector 7.4.2 Ratios to see and analyse the operations in the entity	1

• Learning Outcome 7.4 - Activities and Reference Sheets

- LO7.4 Benefiting from ratios in the hospitality context

Learning objective	7.4.1 Key ratios used in the hospitality sector

In the hospitality sector, several key ratios are commonly used to assess the financial health, performance, and operational efficiency of hotels, restaurants, resorts, and other hospitality businesses. Many have already been listed in earlier units.

Reference Sheet 7.4.1: More typical ratios used in the hospitality sector

Gross Operating Profit (GOP) Margin: GOP margin is a profitability ratio that measures a hotel's operating income as a percentage of total revenue. It is calculated by dividing gross operating profit by total revenue. GOP margin is used to evaluate a hotel's cost management, efficiency, and overall profitability.

Food and Beverage Cost Percentage: Food and beverage cost percentage measures the cost of goods sold (COGS) for food and beverages as a percentage of total food and beverage revenue. It is calculated by dividing COGS by total F&B revenue and multiplying by 100. This ratio helps assess a restaurant's cost control, pricing strategy, and profit margins.

Food Waste Ratio: This ratio measures the amount of food wasted or discarded about the total food produced or served. It is calculated by dividing the weight or cost of wasted food by the total amount of food purchased or prepared. Monitoring and reducing food waste can help improve sustainability, cost management, and environmental impact in F&B operations.

Beverage Cost Percentage: This ratio measures the cost of producing a drink compared to the selling price of the drink. It is calculated by dividing the cost of goods sold (COGS) for alcoholic beve enue from those

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Learning objective	7.4.2 Ratios to see and analyse the operations in the entity

In ratios, you compare two numbers or quantities about to each other. Ratios can be expressed in different formats, such as a fraction (e.g., 2:1), a decimal (e.g., 0.5), or a percentage (e.g., 50 %). Calculate the ratio by dividing one quantity by the other. The numerator of the ratio is typically the first quantity you identify, while the denominator is the second quantity. It's important to ensure that the units are consistent when calculating the ratio. For financial ratios, this typically involves using monetary units such as euros. For non-financial ratios, units may vary based on the specific context (e.g., weight, volume, percentage).

Activity 7.4.2: Calculate key ratios

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

1. Average Daily Rate (ADR): Exercise 1: A hotel earned € 10,000 in room revenue over 100 occupied rooms. Calculate the ADR for the hotel. Exercise 2: A resort generated $ 50,000 in room revenue during a weekend with 200 rooms sold. Calculate the ADR for that weekend.
2. Occupancy Rate: Exercise 1: A hotel has 100 rooms, and on a particular night, 80 rooms were sold. Calculate the occupancy rate for that night. Exercise 2: A bed and breakfast has 10 rooms, and in June, 220 room nights were sold. Calculate the occupancy rate for June.
3. Revenue per Available Room (RevPAR): Exercise 1: A hotel has an ADR of £ 120 and an occupancy rate of 75 %. Calculate the RevPAR for the hotel. Exercise 2: A boutique hotel has a RevPAR of € 150 and an occupancy rate of 80 %. Calculate the ADR for that hotel.
4. Calculate the Average Length of Stay. Exercise 1: In a hotel, 100 guests stayed a total of 400 nights. Calculate the average length of stay for guests at the hotel. Exercise 2: In a resort, the total number of guest nights for July was 1500 and there were 250 arrivals during

Answer key:

Exercise 1:
Calculation: ADR = Total Room Revenue/Number of Rooms
Sold Answer 1: ADR = € 10,000 / 100 = € 100
Calculation: ADR = Total Room Revenue/Number of Rooms Sold Answer 2: ADR = $ 50,000 / 200 = $ 250

Exercise 2:
Calculation: Occupancy Rate = (Number of Rooms Sold / Total Number of Rooms) x 100
Answer 1: Occupancy Rate = (80 / 100) x 100 = 80 %
Answer 2: Occupancy Rate = (220 / (10 x 30)) x 100 = 73.3 %

Exercise 3:
Calculation: RevPAR = ADR x Occupancy Rate
Answer 1: RevPAR = £ 120 x 75 % = £ 90
Answer 2: ADR = € 150 / 80 % = € 187.50

Exercise 4:

5. Learning Unit 7.5: Numbers and calculations in rostering

• *Learning Unit Description*

In this unit, learners are familiarised with the importance and necessity of efficient rostering in the hospitality industry. They will practice arithmetic operations helping in staff scheduling.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.5 Recall arithmetic operations for rostering in the hospitality industry	7.5.1 Arithmetic operations for rostering 7.5.2 Practice examples for scheduling hospitality workers	1

- Learning Outcome 7.5 - Activities and Reference Sheets
  - LO7.5 Evaluating rostering in the hospitality industry

Learning objective	7.5.1 Arithmetic operations for rostering

Rostering in the tourism sector is crucial as it ensures that adequate staffing is available to meet the demands of fluctuating guest numbers and varying service requirements. Effective rostering enables tourism operators to manage labour costs, maintain high-quality service standards, and provide a positive experience for guests. By carefully planning and coordinating staffing levels, operators can minimise overtime, reduce labour costs, and ensure seamless service delivery.

Rostering activities typically include scheduling staff for front-of-house roles, such as reception, hospitality, and food and beverage service, as well as back-of-house roles, such as housekeeping, maintenance, and kitchen staff.

Activity 7.5.1.a: Calculation of additional hours for wait staff

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

A restaurant has three wait staff scheduled to work for a special event. Each wait staff member is scheduled to work a 6-hour shift. However, one of the wait staff, Employee A, needs to leave 2 hours early due to a personal commitment. To ensure adequate coverage, another wait staff, Employee D, is called in to cover the remaining time. How many additional hours need to be filled by Employee D?

Answer key:

Employee A: 6 hours, Employee B: 6 hours Employee C: 6 hours = total hours scheduled for all wait staff: 6 + 6 + 6 = Total hours scheduled for all wait staff: 18 hours

Employee A's scheduled hours: 6 hours, Employee A needs to leave early: 2 hours.

Additional hours needed to be filled by Employee D: 6 - 2 = Additional hours

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Activity 7.5.1.b: Comparison of labour costs and total revenue of a restaurant for one evening

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

A restaurant expects 150 customers on a particular evening. Experience shows that the restaurant needs an average of 1 employee per 10 customers to ensure adequate service. Assume each employee works 6 hours that evening. If an employee's hourly wage is 15 € and the restaurant's total revenue for that evening is € 3000, what is the percentage of labour costs compared to the restaurant's total revenue for that evening?

Answer key:

To calculate the total number of employees, we need to divide the number of customers (150) by the number of customers per employee (10):

150 customers / 10 = 15 employees

Then we calculate the total labour costs by multiplying the number of employees by their hourly wage and the number of hours:

15 x € 15 x 6 = € 1350

Finally, we can calculate the labour cost percentage by dividing the total labour cost by the restaurant's total revenue and multiplying by 100 to get the percentage: Labour Cost Percentage = (Total labour costs/total revenue) × 100

(€ 1350 / € 3000}) x 100 = 45 %

Learning objective	7.5.2 Practice examples for scheduling hospitality workers

Scheduling hospitality workers involves determining and assigning specific shifts or hours to employees based on factors such as business needs, employee availability, skill sets, and labour laws. This process ensures that the right number of staff with the appropriate skills are working at the right times to provide quality service to customers while also optimising labour costs for the business.

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Reference Sheet 7.5.2: Examples of how arithmetic operations may be used in scheduling hospitality workers

Addition: Calculating total employee hours (e.g. adding up the number of hours each employee is scheduled to work in a week to ensure that the total hours meet the business's staffing needs.)

Subtraction: Adjusting shifts by subtracting the hours of an employee who requested time off or called in sick from the total scheduled hours to determine if additional staff needs to be assigned to cover the shift.

Multiplication: Forecasting labour costs using the hourly wage rate in multiplication by the number of hours worked by each employee to estimate the total labour cost for the period.

Division: Calculating average hours per shift by dividing the total weekly hours by the number of shifts to determine the average number of hours each employee is scheduled to work per shift.

Activity 7.5.2.a: Calculating Total Hours and Average Hours per Shift

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

You are the manager of a restaurant, and you need to ensure that the total employee hours meet the business's staffing needs for the week. You also want to calculate the average hours per shift for your employees.

Employee Weekly Hours:

Employee A: 30 hours

Employee B: 35 hours

Employee C: 25 hours

Employee D: 20 hours

Employee E: 40 hours

Task description:

1. Calculate the total number of hours worked by all employees in the week.

2. If the restaurant operates 7 days a week with 2 shifts per day, calculate the average number of hours each employee is scheduled to work per shift.

Answer key:

Activity 7.5.2.b: Adjusting Shifts and Forecasting Labour Costs

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

Employee D from the previous activity requested two days off (16 hours total). You need to adjust the shifts, and you also want to forecast the labour costs for the week.

Employee Weekly Hours (before adjustment):

Employee A: 30 hours

Employee B: 35 hours

Employee C: 25 hours

Employee D: 20 hours

Employee E: 40 hours

Regular wage: 15 € per hour

Task description:

1. Adjust the total scheduled hours after subtracting George's time off (16 hours) and determine if additional staff needs to be assigned to cover the shift.
2. Calculate the total labour cost for the week after the adjustment.

Answer key:

Original hours: 20 hours off: 16 hours, adjusted hours: 20 - 16 = 4 hours

New total hours of employees: A 30 hours, B 35 hours, C 25 hours, D 4 hours (adjusted), E 40 hours.

6. Learning Unit 7.6: Numbers and dimensions for seating plan preparation

• *Learning Unit Description*

In this learning unit, basic numeric operations are used when preparing seating plans. Learners will do calculations regarding restaurant seating capacity, and optimisation of the restaurant seating layout for instance.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.6: Apply numbers and dimensions for seating plan preparation	7.6.1 Arithmetic calculations used for preparing a seating plan 7.6.2 Calculating restaurant seating capacity 7.6.3 Practice examples for optimising the restaurant seating	1

- Learning Outcome 7.6 - Activities and Reference Sheets
  - LO7.6 Applying numbers and dimensions for seating plan preparation

Learning objective	7.6.1 Arithmetic calculations used for preparing a seating plan

Strong numeric skills are essential for creating an effective and efficient seating plan. Basic arithmetic skills necessary when preparing a seating plan include the ability to perform addition, subtraction, multiplication, and division accurately and efficiently to calculate the total number of tables, seats, and

guests, as well as to adjust seating arrangements based on reservations and walk-in guests for instance.

Reference Sheet 7.6.1: Basic arithmetic skills for preparing a seating plan

Addition: Adding up the total number of tables in the restaurant to determine the seating capacity.

Subtraction: Subtracting the number of reserved tables or seats from the total number of available tables to determine the seating availability for walk-in guests.

Multiplication: Determining the maximum number of guests per table by multiplying the number of tables of various sizes by their respective seating capacities.

Activity 7.6.1: Seating plan for evening service

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Context description:

A restaurant is preparing its seating plan for the evening service. The restaurant has a total of 20 tables of various sizes. 10 tables are for 2 guests, 6 tables are for 4 guests, and 4 tables are for 6 guests. Additionally, 2 tables have been reserved for a private event.

Task description:

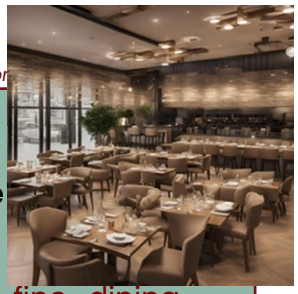
1. How many total tables does the restaurant have for seating?
2. If 2 tables have been reserved for a private event, how many tables are available for walk-in guests?
3. What is the maximum seating capacity of the restaurant if each table is fully occupied?
4. If the restaurant divides its space into two sections, with one section for intimate dining (2 guests per table) and the other for larger groups (4 or 6 guests per table), how many tables would be allocated to each section?

Answer key:

Total number of tables: 20 tables, number of tables available for walk-in guests: 18 tables, maximum seating capacity of the restaurant:

Learning objective	7.6.2 Calculating restaurant seating capacity

A restaurant's seating capacity refers to the maximum number of guests that can be accommodated at tables or bars within the dining area, taking into account the available seating, layout, and safety regulations.



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Reference Sheet 7.6.2: Indicators that influence the seating capacity

Restaurant type and concept: (e.g., if it is a fine dining restaurant, a buffet, casual eatery, intimate or family-friendly restaurant).

Layout and design: The shape and size of the dining area, including the number of tables, chairs, and booths, affect the overall seating capacity.

Table size and spacing: The size and spacing of tables, as well as the type of seating (e.g., booths, chairs, bar stools), influence the number of guests that can be seated comfortably.

Fire safety regulations: Local fire codes and safety regulations dictate the minimum number of square metres per person, which affects the maximum seating capacity.

Local building codes and zoning: Zoning laws and building codes may restrict the maximum number of patrons allowed in a restaurant based on factors like square footage, floor plan, and accessibility.

R**estaurant type and concept:** The type of restaurant (e.g., fine dining, casual eatery, buffet) and its concept (e.g., family-friendly, intimate setting) may influence the desired seating

Activity 7.6.2: Maximum seating capacity for the restaurant's dining area

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Context description:

A restaurant has a total dining area of 500 square meters. The restaurant offers various seating configurations, including tables for 2, 4, and 6 guests. Each guest requires an average of 1 square meter of space. Additionally, there is a separate bar area that occupies 50 square meters and is not used for dining.

Task description:

1. Given that each guest requires an average of 1 square meter of space, what is the maximum seating capacity for the restaurant's dining area

For more advanced groups, also try to solve the following:

2. If the restaurant allocates 60 % of its total space to tables for 2

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Answer key:

Maximum seating capacity for the restaurant dining area: 500 guests

For more advanced learners, here are the answers to the other two questions:

Allocation of tables based on space allocation:

Tables for 2 guests: 500 × 0.60 = 300500 × 0.60 = 300 square meters, which can accommodate 300 tables

Tables for 4 guests: 500 × 0.30 = 150500 × 0.30 = 150 square meters, which can accommodate 150 tables

Tables for 6 guests: 500 × 0.10 = 50500 × 0.10 = 50 square meters, which can accommodate 50 tables

Total seating capacity for each table size:

Tables for 2 guests: 300 × 2 = 600300 × 2 = 600 guests

Learning objective	7.6.3 Practice examples for optimising the restaurant seating

Besides numeric skills, optimising the restaurant seating also requires understanding the physical layout of the restaurant or bar for instance and how different table configurations can be arranged to maximise seating capacity while ensuring a comfortable dining experience for guests. You should be able to estimate the number of tables needed based on the expected number of guests and the average party size, as well as estimate the total seating capacity in different sections of the restaurant once you have done the numeric operations. You might also need to consider and recognise patterns in table layouts to optimize seating arrangements and maximise the use of available space.

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Activity 7.6.3.a: Calculating seating capacity

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Context description:

A restaurant wants to optimise its seating arrangement for a special event. The restaurant has two options for seating: round tables with a diameter of 1.5 meters, and square tables with sides of 1 meter. The restaurant needs to determine which combination of tables will result in more seats for the event.

Task description:

Calculate the seating capacity for both round and square tables, considering the available space and arrangement possibilities. Then, compare the seating capacities of round and square tables to determine the optimal combination. Determine which combination of tables (round and square) will maximise the seating capacity for the event.

Answer key:

Seating capacity for round tables:

The area of a circle = πr^2, where r is the radius. For a diameter of 1.5 meters, the radius is 0.75 meters.

Area of one round table = $\pi \times (0.75)^2 \approx 1.77$ square meters.

Seating capacity for round tables = available space/area of one round

Activity 7.6.3.b: Calculating seating design for maximal seats and maximal comfort and accessibility of guests

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 5 min. to solve the operations.

Step 2: When the time has passed, tell them the results.

Instructions:

Context description:

A newly opened restaurant is designing its seating layout. The restaurant has a limited space of 100 square meters and can choose between rectangular tables with dimensions of 1.2 meters by 0.8 meters or circular tables with a diameter of 1 meter. The restaurant needs to calculate the seating capacity for each table shape and determine the optimal arrangement to maximise seating within the available space.

Task description:

Calculate the seating capacity for both rectangular and circular tables based on the available space. Then, design an optimal seating layout that maximises the number of seats while ensuring comfort and accessibility for guests. Compare the seating capacities of rectangular and circular tables to determine the optimal arrangement.

Answer key:

Seating capacity for rectangular tables:

Area of one rectangular table = length x width.

For dimensions of 1.2 meters by 0.8 meters, the area of one rectangular table = 1.2 x 0.8 = 0.96 m^2.

Seating capacity for rectangular tables = available space/area of one rectanaular table.

Individual Work Assignment 4: Creating an efficient seating plan

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Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and ask learners to solve the operations individually.

Step 2: Give them 15 min and ask them to present their result then.

Instructions:

Context description:

As a restaurant manager, you are tasked with optimising the seating arrangement for a busy Saturday night. The restaurant has a mix of rectangular, circular, and square tables, each with different dimensions. You need to consider factors such as available space, table sizes, and guest preferences to create an efficient seating plan.

Task description:

1. Analyse the available space and the dimensions of each table shape.
2. Calculate the seating capacity for each table shape.
3. Design an optimal seating layout that maximizes the number of seats while maintaining a balanced distribution of table shapes and ensuring guest comfort.
4. Implement the seating plan, considering factors such as group sizes, reservations, and walk-in guests.

In this individual assignment, focus on applying the calculations into practice by considering real-world constraints and requirements to create an effective seating arrangement for the restaurant.

Answer key:

The specific seating layout will depend on the restaurant manager, taking

7. Learning Unit 7.7: Arithmetical operations for preparing a set menu and a buffet

• *Learning Unit Description*

This learning unit offers a comprehensive insight into arithmetical operations used when planning menus and buffets. It covers mathematical operations used to plan costs, room and time needed for the set menu and buffet implementation for instance.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.7: Apply arithmetical operations for a set menu and buffets	7.7.1 Measurements and units used when planning a menu or buffet 7.7.2 Practice arithmetic operation for menu/buffet planning 7.7.3 Practice distances and dimensions in table setting operations	1

- Learning Outcome 7.7 - Activities and Reference Sheets
  - LO7.7 Applying arithmetical operations for a set menu and buffets

Learning objective	7.7.1 Measurements and units used when planning a menu or buffet

When planning a menu or buffet in Europe, the following specific measurements and units may be used to consider which help ensure efficient and cost-effective food service operations while maintaining high standards of quality, sustainability, and customer satisfaction:

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Reference Sheet 7.7.1: Typical specific measurements and units for menu/buffet preparation

Seating capacity: Number of guests (e.g. total number of guests) to be accommodated, guest density (e.g. number of guests per square meter of dining space), size of tables and stools/ seats (length, width, height of tables and stools meters, centimetres, scope of table, etc.) and spacing (distance between them in meters or centimetres).

Buffet layout: serving line length and food station spacing (measured in meters, to determine the number of food stations and layout options)

Room dimensions: the total floor space of the dining area or buffet space (measured in square meters), and height of the ceiling (measured in meters).

Utilities: the electrical capacity/ the power supply available for kitchen equipment, light fixtures, and buffet stations (measured in volts or watts), energy consumption of equipment or buffet stations (measured in kilowatt-hours (kWh)), light brightness (in lumens), the temperature (refrigeration, cooking, and holding food at the appropriate temperature (in degrees Celsius (°C) or Fahrenheit (°F)).

Infrastructure: like plumbing for water supply and drainage capacity (measured in litres per minute or hour) to accommodate kitchen operations and cleaning requirements.

Food: food items (weight in grams, kilograms) or volume (litres, millilitres) for recipe preparation, food waste control, portion

Learning objective	7.7.2 Practice arithmetic operation for menu/buffet planning

Based on the earlier lessons learnt, it is time to use your knowledge and practice it in concrete activities.

Activity 7.7.2.a: Calculate the total quantity

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

A restaurant is planning a buffet dinner for an event. The menu includes three main dishes: chicken curry, beef stew, and vegetable lasagne. The quantities required for each dish are as f

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Chicken curry: 10 kg

Beef stew: 15 kg

Vegetable lasagne: 8 kg

Task description:

Calculate the total quantity of each ingredient required based on the given quantities for each dish and the total quantity of all ingredients needed for the buffet

Answer key:

Activity 7.7.2.b: Calculate the cost of ingredients

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

A cafe is planning its weekly menu. It includes three sandwiches: ham and cheese, turkey club, and veggie delight. The cafe expects to serve 11 ham and cheese, 13 turkey club and 9 veggie delight sandwiches per day. Calculate the cost of ingredients for each sandwich and the total cost for the entire weekly menu.

Cost of Ingredients (in €):

Ham: 1.1 per slice
Cheese: 0.7 per slice
Turkey: 0.5 per slice
Bacon: 1 per slice
Lettuce: 0.3 per leaf
Tomato: 0.7 per slice
Cucumber: 0.4 per slice
Avocado: 0.3 per slice
Bread: 0.9 per slice

Task description:

Calculate the cost of ingredients for each sandwich based on the price per ingredient and the total cost of ingredients for the entire week's menu.

Answer key:

Cost per sandwich:

Ham and cheese sandwich: 1.1 + 0.7 + 0.9 = 2.7 €

Turkey club sandwich: 0.5 + 1 + 0.3 + 0.7+ 0.9 = 3.4 €

Activity 7.7.2.c: Calculate the number of servings

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

A catering service is planning a cocktail party with 30 guests. The menu includes appetizers for each guest: 2 mini quiches, 3 bruschetta and 1 shrimp cocktail.

Task description:

Calculate the total number of servings needed for each appetizer based on the expected number of guests and the total number of servings needed for all appetizers combined.

Answer key:

Total number of servings needed for each appetizer:

2 x 30 = 60 Mini quiches

3 x 30 = 90 Bruschetta

Learning objective	7.7.3 Practice distances and dimensions in table setting operations

Based on the earlier lessons learnt, it is time to use your knowledge and practice it in concrete activities more.

Activity 7.7.3.a: Calculate the area for each setting per table

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

A banquet hall is setting up tables for a formal dinner event. The hall has rectangular tables measuring 2 meters in length and 1 meter in width. The tables need to be arranged to allow sufficient space between each table for guests and wait staff to move comfortably.

Task description:

Calculate the area required for each table setting, including space for chairs and movement and determine the optimal distance between tables to ensure comfort and accessibility for guests and wait staff.

Answer key:

To ensure comfortable movement and space between tables, a common guideline is to leave approximately 1 m^2 of space between tables which allows guests and wait staff to move around freely without feeling crowded or restricted.

Activity 7.7.3.b: Calculate the area of the circular table setting

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and let learners do the calculation.

Step 2: Give them 15 min and ask one of them to present the result then.

Instructions:

Context description:

A restaurant is arranging tables for outdoor dining on its patio. The patio has circular tables with a diameter of 1.5 meters. The restaurant needs to calculate the space required to set up the tables and ensure adequate distance between them.

Task description:

Calculate the area required for each circular table setting, including space for chairs and movement and determine the optimal distance between circular tables to maintain a comfortable dining experience for guests.

Answer key:

Each circular table has a diameter of 1.5 meters, which means the radius (r) is half of the diameter, so r = 1.5 / 2 = 0.75.

The area of the circle is calculated using the formula:

Area = π x 0.75 m²: = π x (0.75 m)² = 3.14 x (0.75 x 0.75) = 1.77 m². The optimal

Individual Work Assignment 5: Designing an optimal seating layout

As an event planner, you are responsible for setting up tables for a wedding reception in a banquet hall. The hall has a mix of rectangular and round tables, and you need to ensure that the seating arrangements are comfortable and visually appealing. Additionally, you must consider factors such as the number of guests, space constraints, and table decorations.

Calculate the area required for each table setting, considering the dimensions of rectangular and round tables, and design an optimal seating layout that maximises space utilisation while maintaining comfort and accessibility for guests.

Implement the seating plan, ensuring that tables are arranged according to the calculated dimensions and considering factors such as aisle space, emergency exits, and focal points.

Answer key:

The answer key for the individual assignment will depend on the specific

8. Learning Unit 7.8: Practicing arithmetical operations for cleaning tasks in the hospitality industry

• *Learning Unit Description*

In this learning unit, various units, measures, tools for measuring and preparing ingredients, and tools in cleaning tasks at different posts in the hospitality industry are explored. Learners practice measuring chemical cleaning agents and mixing possible green alternative cleaning products. They learn about dimensions, weight, radius range etc. of tools, to read and calculate degrees and percentages.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.8: Practice arithmetical operations for cleaning tasks	7.8.1 Mathematic operations in the housekeeping/ maintenance department 7.8.2 Example practice (e.g. calculate chemical dilution rates and ratios, know green cleaning options)	1

- Learning Outcome 7.8 - Activities and Reference Sheets
  - LO7.8 Practicing arithmetical operations for cleaning tasks

Learning objective	7.8.1 Mathematic operations in the housekeeping/maintenance department

In cleaning operations within the hospitality service industry, it is essential to have a variety of tools and equipment that are suitable for different tasks and surfaces. Providing accurate dimensions, weights, radius ranges, and other

specifications for these tools can help ensure proper usage, efficiency, and safety.

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Reference Sheet 7.8.1: To calculate degrees and percentages

Degrees are a unit of measurement for angles. To calculate degrees, you may need to determine the angle measure based on the sum of angles in a triangle (180 degrees) or a full circle (360 degrees).

A full rotation around a point is 360 degrees. Each degree can be further divided into minutes (1° = 60 minutes) and seconds (1° = 60 seconds).

To convert between degrees, minutes, and seconds, you can use the following relationships: 1 degree = 60 minutes 1 minute = 60 seconds

To calculate percentages, you may need to know the total value

Activity 7.8.1.a: Calculate the degrees

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions. Learners shall calculate the degrees. They have 10 min. time.

Step 2: After 10 min. present the correct answer.

Instructions:

In a hotel room, the housekeeping staff member needs to vacuum the corners of the room using a vacuum cleaner. The staff member needs to calculate the angle at which to push the vacuum cleaner attachment to effectively clean the corners. The staff member needs to vacuum the corners of the room, which form a right angle (90 degrees).

Answer key:

To effectively clean the corners of the room, the staff member needs to glide the vacuum cleaner attachment along each corner at a 45-degree

Individual Work Assignment 6: Some typical mathematic operations in housekeeping/maintenance

Choose three of the following operations to do the respective calculation for your hospitality provider. Tell the result your teacher to discuss it with him/her.

Calculate departmental budgets for supplies, equipment, and labour costs.

Calculate expenditures to stay within budget constraints.

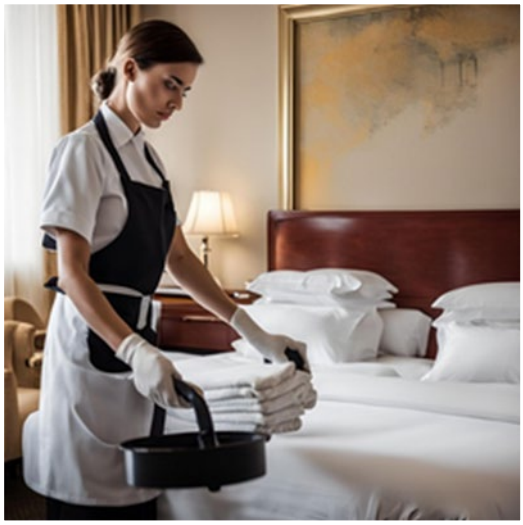
Calculate inventory levels for cleaning supplies, linens, and amenities.

Reorder and restock inventory based on usage rates and par levels.

Conduct inventory audits to reconcile physical stock quantities with records.

Create work schedules for housekeeping staff based on occupancy rates and cleaning requirements.

Allocate resources such as labour hours, equipment, and supplies e



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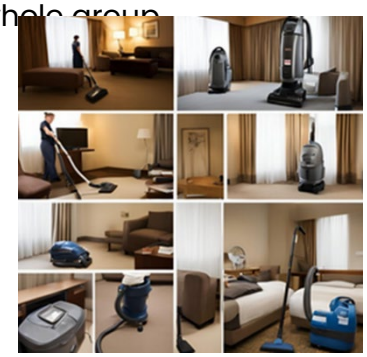
Activity 7.8.1.b: Compare the following examples with the tools you use in your hospitality business

Materials: cleaning tools, scale, ruler, calculator

Steps:

Step 1: Distribute the tools you use to compare them to the dimensions given in the list below. Give learners 10 min to solve the task.

Step 2: After 10 min. discuss the results with the whole group.



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Example dimensions of tools:

Vacuum Cleaner: Dimensions:
38 cm x 30 cm x 81 cm, Weight: 4.5 kg,
Cleaning Radius: 9 meters

Floor Scrubber: Dimensions:
51 cm x 64 cm x 114 cm, Weight: 23 kg,
Brush Radius: 30 cm

Mop Bucket and Wringer:
Dimensions: 46 cm x 30 cm x 91 cm,
Weight: 6.8 kg, Bucket Capacity: 19 litres

Microfiber Cleaning Cloths:
Dimensions: 40 cm x 40 cm (standard size),
Weight: 0.05 kg each

Learning objective	7.8.2 Example practice (e.g. calculate chemical dilution rates and ratios, know green cleaning options)

There is a growing trend towards adopting environmentally friendly and sustainable cleaning practices also in the hospitality sector. These green cleaning options do not use dangerous detergents and are considered safe for both the environment and human health.

The ratio of a concentrated (chemical) solution to water or another solvent in order to create a diluted solution with the desired concentration is called the dilution rate. Dilution rates are typically expressed as ratios or percentages, and they vary depending on the specific chemical being used and the intended application. Failure to dilute chemicals correctly can lead to ineffective cleaning, potential health hazards, and damage to equipment or surfaces.

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Reference Sheet 7.8.2: Get green cleaning

This includes cleaning products that are certified as eco-friendly, biodegradable, and free of harmful chemicals such as

phosphates, chlorine, and synthetic fragrances. They typically contain natural ingredients like plant-based surfactants and essential oils (citrus-based for instance).

Common household ingredients like vinegar and baking soda can be used for cleaning and deodorising surfaces. They are non-toxic, cost-effective, and safe for the environment. For example, vinegar can be used as a natural disinfectant, while baking soda is effective for scrubbing and removing stains.

Microfiber cloths are reusable, durable, and effective for cleaning various surfaces without the need for chemical cleaners. They trap dirt, dust, and bacteria, making them a sustainable alternative to disposable wipes.

Steam cleaning uses high-temperature steam to sanitise and

Individual Work Assignment 7: "Go Green"

Find online alternative cleaning products and practices that align with the specific needs and regulations of the European hospitality industry and your country's regulations.

Activity 7.8.2.a: Calculate chemical dilution rates and ratios

Materials: paper and pen, calculator

Steps:

Step 1: Hand out real cleaning liquids in use at the hospitality provider.

Step 2: Ask learners to form groups of three to calculate for a 10-litre bucket the necessary ratio of ingredients. How is it if the dilution rate is 1:10? Give them 5 min. for the calculations.

Step 3: Let them calculate then for how many rooms the cleaning solution will last (following the description of the cleaning product producer). Then ask them to calculate how many buckets they need for 15 rooms. In total, this step should not last longer than 10 min.

Activity 7.8.2.b: Calculate the degrees

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions. Learners shall calculate the degrees. They have 10 min. time.

Step 2: After 10 min. present the correct answer.

Instructions:

In a restaurant kitchen, the maintenance technician is tasked with adjusting the angle of the exhaust hood above the stove to improve ventilation and airflow. The maintenance technician needs to adjust the angle of the exhaust hood, which is currently positioned at 30 degrees.

To optimise ventilation and airflow in the kitchen, the maintenance

9. Learning Unit 7.9: Practicing currency exchange

• *Learning Unit Description*

This unit covers arithmetic calculation examples to learn how to handle foreign currency in the hospitality industry.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.9: Handle exchange of currency in the hospitality industry	7.9.1 Exchange rates and calculating foreign currency 7.9.2 Practicing calculating prices at different currency rates	1

- Learning Outcome 7.9 - Activities and Reference Sheets
  - LO7.9 Handle exchange of currency in the hospitality industry

Learning objective	7.9.1 Exchange rates and calculating foreign currency

Exchange rates refer to the value of one currency in terms of another currency. It indicates how much of one currency is needed to purchase a unit of another currency. Exchange rates fluctuate constantly due to various factors such as economic conditions, political events, market speculation, and government policies. You might need to convert currencies for transactions with customers, suppliers, or partners from other countries. Knowing exchange rates is crucial for pricing products and services.

Reference Sheet 7.9.1: Exchange Rate Formula

Exchange Rate = Amount in Currency A/Amount in Currency B

For example, if the exchange rate between Euro (EUR) and US Dollar (USD) is 1.20, it means that 1 Euro is equivalent to 1.20 US Dollars. To convert 100 Euros to US Dollars, you would perform the calculation:

100 EUR * 1.20 = 120 USD

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Learning objective	7.9.2 Practicing calculating prices at different currency rates

Activity 7.9.1.a: Exchange rate calculation

Materials: paper and pen, calculator

Steps:

Step 1: Tell learners the situation description and give learners the handout with the exchange rates to calculate the amount of Euro. They should do this in 10 min.

Step 2: After 10 min. compare the results with the answer key.

Instruction:

You work at a hotel restaurant where international guests want to pay in their currency, so you have to calculate the exchange rate. How much do you have to get in the following currencies to receive the EUR they consumed in the restaurant:

1 EUR equals CHFR 0.97; PLN 4.28; 7.43 DKK

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Answer key:

130.46 CHR

Activity 7.9.1.b: Exchange rate calculation

Materials: paper and pen, calculator

Steps:

Step 1: Hand out the instructions and give learners 30 min. time.

Step 2: Collate the results and inform learners about the correct results the next day.

Instructions:

Here is a sample price list from a hotel with prices listed in three different currencies - Euro (EUR), US Dollar (USD), and British Pound (GBP) – for the standard room. Unfortunately, for some of the other room categories the price is not legible anymore but you need them to compare them for a price analysis. Calculate the used exchange rate and then calculate the missing prices for the currencies.

Room Rates at Hotel XYZ:

Standard Room:

EUR 150 per night

USD 180 per night

GBP 130 per night

Deluxe Room:

EUR …… per night

USD 240 per night

GBP …… per night

Suite:

Answer key:

For converting prices between Euro (EUR) and the other currencies the following exchange rates were used: USD to EUR: 1 USD = 0.8333 EUR and GBP to EUR: 1 GBP = 1.1538 EUR

Standard Room:

EUR 150 per night

USD 180 per night

GBP 130 per night

Deluxe Room:

EUR 200 per night

USD 240 per night

GBP 175 per night

Suite:

EUR 300 per night

Individual Work Assignment 8: Current exchange rates

Get the current exchange rates for USD, British Pounds (GBP), Swiss Franc (CHF), Polish Zloty (PLN) and Norwegian Krona (NOK) and calculate the exchange rate for the same amount you had in the earlier exercise. See the ratio of how much it has increased or decreased. Ask your teacher for support, if needed.

10. Learning Unit 7.10: Electricity, water, heating – energy consumption and related measurements

• *Learning Unit Description*

In this learning unit, different arithmetic operations are learnt applying typical units and measures used for energy consumption. By also addressing for instance CO2 footprint and water consumption using different tools, learners are in addition sensitised towards sustainable use of energy in the hospitality industry.

• *Learning Outcomes and Objectives*

Learning Outcomes	Learning Objectives	Duration (Hours)
LO7.10: Recall energy consumption and related measurements in the hospitality sector	7.10.1 Units and measures used in energy calculation in the hospitality industry 7.10.2 The use of CO^2 footprint and water consumption calculators for the hospitality industry 7.10.3 Calculating the energy consumption of the hospitality entity and finding areas that use the most energy	1

- Learning Outcome 7.10 - Activities and Reference Sheets
  - LO7.10 Assess energy consumption and related measurements in the hospitality sector

Learning objective	7.10.1 Units and measures used in energy calculation in the hospitality industry

Hotels, restaurants, and other facilities that require heating, cooling, lighting, and other energy-intensive services use various units and measures to quantify and calculate energy consumption.

Reference Sheet 7.10.1: Units and measures to quantify and calculate energy consumption

Kilowatt-hour (kWh): Kilowatt-hour is a unit of energy measurement that is commonly used to quantify electricity consumption. It is equivalent to the consumption of one kilowatt of power for one hour. Energy bills for electricity consumption in hotels and restaurants are typically measured and billed in kilowatt-hours.

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Peak Demand: Peak demand refers to the maximum amount of electricity or energy consumed by a hospitality facility at a given time. Peak demand charges are often a significant component of electricity bills for commercial customers. Managing peak demand can help reduce energy costs.

Carbon Emissions: Carbon emissions are a measure of the greenhouse gases emitted as a result of energy consumption

Learning objective	7.10.2 The use of CO^2 footprint and water consumption calculators for the hospitality industry

By using CO2 footprint calculators, hospitality businesses can quantify their carbon emissions and identify key sources of environmental impact. Calculating and reporting CO2 emissions and water consumption data can enhance transparency and accountability in the hospitality industry.

Individual Work Assignment 9: Calculate footprints

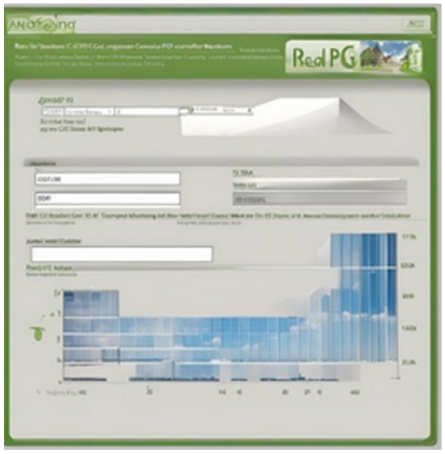
Materials: paper and pen, PC/tablet

Instructions:

Go to the online calculators and calculate the footprint of your operation. You can then also research alternative calculators online.

World Wildlife Fund (WWF) Footprint Calculator: The WWF Footprint Calculator allows businesses, including those in the hospitality sector, to measure their carbon footprint and explore ways to reduce environmental impact. The tool provides personalised recommendations for sustainability actions based on the user's footprint results. Link: https://footprint.wwf.org.uk/#/

Carbon Trust Hospitality Footprint Calculator: The Carbon Trust offers a Hospitality Footprint Calculator tailored to the specific needs of hotels, restaurants, and catering establishments. This online tool helps businesses assess their carbon emissions, identify areas for improvement, and access resources to support sustainability initiatives. Link: https://www.carbont ality-carbon-



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Learning objective	7.10.3 Calculating the energy consumption of the hospitality entity and finding areas that use the most energy

Activity 7.10.3: Calculate energy consumption

Materials: paper and pen, calculator

Steps:

Step 1: Form groups of 2 to three learners. Hand out the instructions and let learners collate details in groups, and do the calculation.

Step 2: Give them 30 min and discuss then the result with them.

Instructions:

Context description

The task is to get the current year's energy invoice. See how much it was the previous year. Calculate the total costs including the rest of the year assuming that the consumption will not increase in one and that the consumption increases by 15 % while the price will be stable. In a third try to find out the total price of the current year, if half of the year the price would increase by 5 %.

Compare the prices and the overall consumption. Compare the two years and see which department used the most in case this has been specified. Show the one with the highest and the one with the lowest as ratios.

You will need to remember Addition, Subtraction, Multiplication and

Homework – Assignments with an overall duration of 4 hours – overview:

Individual Work Assignment 1: Additional considerations

Individual Work Assignment 2: Your favourite dish

Individual Work Assignment 3: Practice example settings

Individual Work Assignment 4: Creating an efficient seating plan

Individual Work Assignment 5: Designing an optimal seating layout

Individual Work Assignment 6: Some typical mathematic operations in housekeeping/maintenance

Individual Work Assignment 7: "Go Green"

Individual Work Assignment 8: Current exchange rates

Individual Work Assignment 9: Calculate footprints