CAMBRIDGE
International Education

# Teaching Pack
# AO2 Application
# Operations management

## Cambridge IGCSE™/ IGCSE (9–1)
## Business 0264 / 0774

## Cambridge O Level
## Business 7081

For examination from 2027


Cambridge Pathway

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# Contents



**Icons used in this pack:**

**Assessment Objective (AO) lesson**

**Skill development lesson**

**Independent lesson**

# Introduction

This pack will help you to develop your learners' higher order thinking skills as defined by AO2 in the course syllabus.

> **Important note**
> Our *Teaching Packs* have been written by **classroom teachers** to help you deliver lessons which develop higher order thinking skills. Use these materials to supplement your teaching and engage your learners. You can also use them to help you create lesson plans for other parts of the syllabus.

This is one of a range of *Teaching Packs*. Each pack is based on one assessment objective which is contextualised within one area of the syllabus. The packs can be used in any order to suit your teaching sequence.

The structure is as follows:

| Assessment Objective (AO) lesson (1 hour*) |
| --- |
| This lesson is designed to develop your learners' understanding of the skill being developed. This should help them to gain maximum benefit from the subsequent lessons. |
| ↓ |
| **Skill development lesson(s) (1 hour*)** |
| These lessons further introduce and extend the focus skill(s).<br>It also reminds learners of any content needed to contextualise these. |
| ↓ |
| **Independent lesson (1 hour*)** |
| This lesson consolidates and builds on the progress learners have made.<br>In most cases, it will allow learners to work independently in a novel setting to use the skills they have developed. |

** the timings are a guide only; you may need to adapt the lessons to suit your circumstances.*

In this pack you will find the lesson plans, worksheets for learners and teacher resource sheets you will need to successfully complete the lessons.

# AO2: Application

This *Teaching Pack* focuses on AO2 Application – apply knowledge and understanding of business concepts, terms and theories.

This Teaching Pack has links to the following syllabus content (see syllabus for detail):

4.1.1 Production processes
4.1.2 The main methods of production
4.2 Technology and production of goods and services

The lessons cover the following skills, adapted from **AO2: Application** (see syllabus for assessment objectives):

- Apply knowledge and understanding of business concepts, terms and theories to a given business.

Please note that analysis and evaluation will feature in some activities, but these skills are focussed on in more depth in other *Teaching Packs* and *Scenario Packs*.

## Prior knowledge

Knowledge from the following syllabus topics is useful for the activities that follow:

1.5.2 The role of stakeholder groups

## Teacher notes

The suggested activities are to help engage your learners as they develop the skill of applying their business knowledge to a range of business scenarios and contexts.

Learners can find applying their business knowledge difficult. For example, the methods for motivating the workforce in a car manufacturing plant will be different to those used to motivate a team of sales people selling kitchens. Learners need to be able to take their business knowledge and apply it in the context of different businesses and business scenarios.

It is also important to consider the context of the size of the business when applying knowledge. For example, is it a 'for profit' or 'not for profit' business? Is the business well established or a start-up?

Learners need to focus on how to use the business knowledge they have in given situations. The Assessment Objective (AO) lesson, skill development lesson and the independent lesson activities will help them practice this.

# AO lesson: Applying business knowledge

| | |
|---|---|
| **Resources** | Worksheet A, Worksheet B and Worksheet C |

| | |
|---|---|
| **Learning objectives** | By the end of the lesson:<br>***all*** learners should be able to draft an answer to a given question<br>***most*** learners should be able to write a full model answer to a given question<br>***some*** learners will be able to write a model answer to a given question, using what they have learnt and without the model |

| Timings | Activity |
|---|---|
|  | **Starter**<br><br>Introduce learners to the requirements of AO2 using the information below. The whole focus of this lesson will be for them to understand what we mean by application.<br><br>• In the exam, learners are often provided with some information about the business the question is focussed on. For example, they might be told the type of business, its future plans, how many employees there are etc.<br><br>• To ensure they are applying your business knowledge, they will need to focus their answer on the specific business mentioned in the question.<br><br>• This means their answer will be in **'context'**.<br><br>• They will need to use the information given, when answering questions to help demonstrate that they are applying their knowledge.<br><br>Ask learners to vote for their responses to the following true/false statements. Make sure that you ask learners to justify their answers, why is it true or false?<br><br>1. Application means putting the answer in the context of the specific business (true)<br><br>2. Application means just using the name of the business (false)<br><br>3. Good application allows the reader to get a sense of the individual business's circumstances like what market they operate in (true)<br><br>4. Application means using businesses I think of as examples (false)<br><br>5. Application involves using specific information from a case study (true) |


**Main lesson**

Learners should read through the responses on Worksheet A and note where they think AO2 is being shown by underlining or highlighting the parts of the answers that show the information has been applied.


Learners should then look at the four stakeholder statements on Worksheet B. They have to decide if the statements have been applied in a business context. They should record and explain their answers on the worksheet.


Give learners Worksheet C. Read through the example business case studies together. Learners should then read the exam style answers and see if they can match them to the business case studies. This 'back to front' approach will help learners focus on the answer in order to recognise application. Discuss how the use of context rather than the use of the business name allows the learners to know which answer goes with which business case study.


**Plenary**

Get each learner to discuss with their partner what application means and how they might demonstrate application. They could write a few points in their books.

Select a few pairs to feed back to the rest of the class to ensure all learners have an understanding of how they might demonstrate application.

# Skill development lesson: Applying knowledge

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|---|---|
| **Resources** | Worksheet D, Worksheet E and Worksheet F |

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|---|---|
| **Learning objectives** | By the end of the lesson:<br>***all*** learners should be able to identify at least one objective for each stakeholder group<br>***most*** learners should be able to identify a conflict of interest between two stakeholder groups in a given situation<br>***some*** learners will be able to make recommendations in a given scenario, which recognises why it is important for businesses to satisfy stakeholder objectives |

| Timings | Activity |
|---|---|
|  | **Starter**<br>Give learners Worksheet D and encourage them to answer the multiple choice questions. Learners should then be given the answers so they can mark their own work or that of their peers. Areas where they have been unsure should help them to identify areas for further revision. |
|  | **Main lesson**<br>Hand out Worksheet E. The main objective is to encourage learners to write an answer specific to the scenario provided. The first example has been done for them.<br><br>Get learners to give feedback on their answers and go over them as a class to ensure that all of them have a relevant answer showing good application to each of the scenarios.<br><br>Hand out Worksheet F and read through the case study as a class. Learners should answer questions 1 to 5. They can use the answer sheet to check their responses. |
|  | Learners should complete question 6 which takes them step by step through the process of creating a recommendation for the business Uniform Plus+. |
|  | **Plenary**<br>Encourage learners to assess each other's responses, have they shown application? A model answer is available from the teacher version of Worksheet F. |

# Independent lesson: Operations case studies

| | |
|---|---|
| **Resources** | Worksheet G, Worksheet H and Worksheet I |

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| **Learning objectives** | By the end of the lesson:<br>***all*** learners should be able to use at least one case study to identify the key stakeholders and their objectives in that business context<br>***most*** learners should be able to identify from case study material which stakeholders may have conflicting objectives<br>***some*** learners will be able to justify whether the conflict between two stakeholders is likely to occur |

| Timings | Activity |
|---|---|
|  | **Starter**<br>Using Worksheet G, learners should match the correct key term next to the definition and check their answers.<br><br>The answers are available so learners can check their work and make corrections. This will help them to access the case studies and questions that follow. |
|  <br>  | **Main lesson**<br>Read the case study together on Worksheet H and then ask your learners to answer the questions in groups of 3 or 4.<br><br>Hand learners Worksheet I. It introduces an individual task to enable learners to practise the skill of applying their business knowledge and understanding. Ask learners to feedback their answers on Worksheet I. Try to engage all learners by building up a final set of answers on the board by taking points from each of them.<br><br>You could use the suggested answer sheet for Worksheet I to help draw out content for the answers. |
|  | **Plenary**<br>Ask learners to reflect on their ability to apply their knowledge.<br><br>Encourage learners to give themselves three targets to ensure they show AO2 application in future work and their exam answers. |

# Worksheets and answers

| | Worksheets | Answers |
|---|---|---|
| **For use in *Assessment objective lesson:*** | | |
| **A:** Identifying application | **11** | **32** |
| **B:** Operations statements | **12 – 14** | **33** |
| **C:** Applying business knowledge | **15 – 16** | **34** |
| **For use in *Skill development lesson:*** | | |
| **D:** Multiple choice questions | **17 – 18** | **35** |
| **E:** Methods of production | **19 – 20** | **36 – 38** |
| **F:** Operations scenarios | **21 – 25** | **39 – 41** |
| **For use in *Independent lesson:*** | | |
| **G** Key terms | **26** | **42** |
| **H:** Operations case study 1 | **27 – 28** | **43 – 44** |
| **I:** Operations case study 2 | **29 – 31** | **45 – 47** |

# **Worksheet A:** Identifying application

Read the question and answers below. Underline or highlight where you think good application is being shown.

Here are some reminders about application:

- In the exam, you are often provided with some information about the business the question is focussed on. For example, you might be told the type of business, its future plans, how many employees there are etc.
- To ensure you are applying your business knowledge, you will need to focus your answer on the specific business mentioned in the question.
- This means your answer will be in **'context'**.
- You will need to use the information given, when answering questions to help demonstrate that you are applying your knowledge.

George and Catherine have both just completed a bakery course at their local college. They plan to set up their own baking business by selling bread rolls to the canteen at their old school as well as making specialty cakes for birthdays and weddings.

Recommend which methods of production they should use.

**Answer 1**:

*I recommend that George and Catherine use batch production to make their product because groups of identical products can be made at the same time which can save time and money for a business. The cakes should be job production which means that each product is a one off for a customer.*

**Answer 2**:

*I recommend that George and Catherine use batch production to make the bread rolls for their old school canteen because groups of identical products can be made at the same time which means that the canteen can get as many of that type of roll as they want.*

*The speciality birthday and wedding cakes should be job production which means that each product is a one off for a customer like a bride who wants her own design and colours.*

# **Worksheet B:** Operations statements

Read the following operations statements. For each of them, you should decide if they have been made in context or not. You need to explain your answer.

**Statement 1**
*Job production is helpful because it allows one off products to be made which meet individual customers' needs.*

I know this statement has / has not been made in a business context because

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**Statement 2**
*Sarah is using job production to create her highly decorated pottery plates which people buy as presents after she has decorated them with names, places and dates to meet the customers' requirements.*

I know this statement has / has not been made in a business context because

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# Worksheet B: *continued*

**Statement 3**

*I would recommend that Ed's Bakery uses batch production to produce a range of bread and cakes for distribution to shops within a 20-mile radius. This means more can be produced than if Ed used job production. A problem with this is that the business needs to stock enough ingredients like flour and sugar to make the different kinds of bread, which costs money.*

I know this statement has / has not been made in a business context because

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**Statement 4**

*They should use batch production because that is the normal way for this product to be made.*

I know this statement has / has not been made in a business context because

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# Worksheet B: *continued*

**Statement 5**

*Kaizen means involving and encouraging workers to make suggestions for small, frequent improvements which add up to huge increases in operational efficiency.*

I know this statement has / has not been made in a business context because

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**Statement 6**

*The costs of holding three weeks' supply of flour, sugar, salt and oil were reducing the profits of BakeitWell Family Bakers until they moved to a JIT stock system which meant they only kept two days' worth of supplies at any one time.*

I know this statement has / has not been made in a business context because

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# **Worksheet C:** *Applying business knowledge*

Match each exam style answer with the correct business case study from the second page.

| Exam style answer | Case study |
|---|---|
| | The Coppicing Cooperative is a small business run by like-minded people who feel passionately about the care of woodland and aim to create sustainable products through a technique called coppicing. This involves certain types of trees being cut back to the trunk to encourage the plant to produce new wood. The wood that is cut is used to make charcoal and bespoke wooden furniture to customers' orders. |
| | Colour Show Paints plc makes a range of paints used for home decorating. They make different finishes of paint in a wide variety of different colours. The ingredients including pigments are mixed to make the right type and colour then put into cans in the canning room, then the label and lid are pressed into position. Once that group of paints has been manufactured, the factory switches to make a different type and colour of paint. |
| | Square Deal Homes Ltd specialise in building energy efficient new homes with solar panels and grey water capture systems to use water from baths and kitchen sinks to water the plants in each house's garden. They build one model of their energy efficient home on a new housing estate, then switch to another model on another housing estate. |
| | Easy Cook Food plc has one of the world's largest canning facilities just outside of Wigan in the UK. Over 1 billion tins of baked beans are made continuously by mixing the beans with the sauce, putting the mixture into tins then sealing the tins. The tins then move to an oven where the beans are cooked inside the tins. Conveyor belts move the tins through a cooling and labelling area. Tins of beans are made every day throughout the year. |
| | Cute Cars plc mass produces their 4 seat, fuel efficient cars on an automated assembly line. The cars move along a conveyor belt and different robots undertake the welding and assembly as well as the final painting at the end of the manufacturing process. |
| | Miles Harper is a well-known wedding photographer. Before each wedding he has several meetings with the bride and groom to determine the style of photographs he should take to best meet their needs and so they can relax on their big day knowing he will take all the group shots and formal pictures they require. |

# Worksheet C: *continued*

Match these case studies to the exam style answers on the first page of the worksheet.

| | |
|---|---|
| 1. *Bernard Le Glas uses job production to make hand crafted wooden furniture to meet specific customer orders for dining chairs.* | 2. *An advantage of flow production is that large amounts can be made continuously using automation. This means that unit costs will be very low as the ingredients and the labour costs will be very small.* |
| 3. *The advantages of making different products using batch production are that the needs of different customers can be met.* | 4. *Batches are made to meet the needs of specific developments by making one model suited to the local conditions. Using batch production in this way can also reduce costs because larger quantities of materials can be bought which means the firm can negotiate a better discount from suppliers.* |
| 5. *While it is very expensive to set up a production line with robots, the business can still make cost savings because the firm will benefit from economies of scale. This means that each item is cheaper to make because there are low labour costs. The quality will also be better as the robots are always accurate.* | 6. *An advantage of job production is that the end result is high quality, it meets the specific needs of customers and the workers will get more satisfaction from working on the item from start to finish.*<br>*A disadvantage is that the labour costs will be higher as a skilled worker and specialist equipment are expensive.* |

# **Worksheet D:** Multiple choice questions

Select the best answer for the following questions:

1. Jennifer Jones makes and ices wedding cakes for brides. Which method of production is she most likely to use?
   - ☐ Job production
   - ☐ Batch production
   - ☐ Flow production
   - ☐ Computer-Aided manufacture

2. Walsall Bakery uses batch production to make its bread. Which of the following is a disadvantage of using this production method?
   - ☐ The costs of production are lower than other methods of production
   - ☐ It can meet the demand for different types of bread from customers
   - ☐ It may have to limit the range of bread it can offer
   - ☐ It can make bread to order so the bread does not need to be stored

3. Which of the following is **not** an example of automation?
   - ☐ Beer bottles being labelled by machine when they pass through the production line
   - ☐ The sewing of a wedding dress by hand
   - ☐ A business has sensors on the doors to make them open when someone approaches
   - ☐ Customers of Cute Cars plc can configure and order their own car online which is added to production without any further input

4. Which of these statements is true about the importance of quality?
   - ☐ It is easy to gain a reputation for quality
   - ☐ It is easy to lose a reputation if products are low quality
   - ☐ Producing high quality goods always increases sales
   - ☐ Producing high quality goods is always cheaper than producing low quality goods

5. Productivity is best described as:
   - ☐ A measure of output per unit of labour input
   - ☐ A measure of cost
   - ☐ A measure of labour
   - ☐ A measure of customer satisfaction

6. Which of these is **not** a way to increase productivity?
   - ☐ Invest in up to date machinery
   - ☐ Purchase less expensive, older machinery
   - ☐ Replace manual workers with automated equipment
   - ☐ Improve motivation so workers are enthusiastic and work harder

# Worksheet D: *continued*

7. Which of the following statements is an **advantage** of Just In Time stock control?
   - ☐ There is a greater risk of running out of stock
   - ☐ Buying smaller quantities more often means losing out on bulk buying discounts
   - ☐ Eliminating buffer stock cuts storage space, allowing for more sales or manufacturing space
   - ☐ Any mistakes can cause an item to become out of stock

8. Which of the following statements about quality assurance is **true**?
   - ☐ There may be less wastage and this will reduce production costs
   - ☐ Workers will be less motivated if they have responsibility for quality
   - ☐ The business will experience complaints if quality improves
   - ☐ Workers will be able to work more quickly as they are not stopping to check their work

9. Which of the following statements is an **advantage** of quality control?
   - ☐ It can help prevent faulty goods and services being sold
   - ☐ I can help prevent waste of resources in production
   - ☐ I can help prevent inspection costs increasing
   - ☐ It can help encourage each worker to be responsible for quality

# **Worksheet E:** Methods of production

For each of the production activities in the table below, recommend one appropriate method of production from job, batch or flow. Give a reason for your recommendation using information relevant to the scenario. Explain a problem that could result from using the method you have recommended for the specific context.

| Production Activity | Method of production | Reason for recommendation | Possible problem |
|---|---|---|---|
| A specialist tailor makes made to measure men's suits. | | | |
| An expensive sports car manufacturer produces cars to order for wealthy clients who want a unique product. | | | |
| A multinational car company produces large numbers of cars in Germany to export to the rest of the world. | | | |
| A local bakery produces a range of bread, rolls and cakes for distribution to shops within a 20 mile radius. | | | |

# Worksheet E: *continued*

| Production Activity | Method of production | Reason for recommendation | Possible problem |
|---|---|---|---|
| An office furniture manufacturer produces wooden furniture to order for unusual spaces. | | | |
| A sugar refinery produces hundreds of tons of sugar each day through an automated process that takes place 365 days a year. | | | |
| A brewery produces hundreds of bottles of beer daily. The bottles are washed, filled, capped and labelled by machinery using a conveyor belt system. | | | |
| A small company produces three models of caravan, each requiring a different steel frame. The company makes one model at a time then switches production to another model. They have found a way to use the same cooker, fridge and shower components for all the models. | | | |

# **Worksheet F:** Operations scenarios

## Scenario 1

Cute Cars plc is a business that manufactures small, fuel efficient cars in a variety of colours. They aim to keep control of their costs of production and have noticed that their productivity is not as good as one of their competitors, Adorable Autos plc.

1. Calculate the labour productivity of each car manufacturer

| Car Manufacturer | Staff | Output (Cars) per year | Labour productivity (cars per worker per year) |
|---|---|---|---|
| Cute Cars plc | 27 000 | 110 000 | |
| Adorable Autos plc | 2 750 | 270 000 | |

## Scenario 2

Uniform Plus+ was established in 2020 and has become a leading supplier of work wear, school uniforms, leisure wear and promotional clothing. They supply schools and businesses with a range of uniforms and branded clothing items like polo shirts with the name and logo of specific companies. The have recently moved to a new purpose built facility incorporating their head office and factory. Uniform Plus + manufactures over 12 000 garments a week and supplies more than 5 500 customers.

The factory has a new 3D printing system to help meet the specific needs of the schools and other businesses they supply. The stock ordering system is also computerised to ensure that they can function on a Just In Time basis which helps keep costs down and saves space in the factory.

Uniform Plus + has invested in the latest technology such as advanced sewing machines which allow staff to overlock and put logos on in embroidery as soon as they have finished the seams. These and the new cutting robots have increased productivity for the business.

As Uniform Plus + supplying different kinds of business they are very concerned that they maintain the highest quality standards so that they do not get a reputation for poor quality which might make them lose business.

# Worksheet F: *continued*

1. Explain which method of production Uniform Plus + is likely to use when manufacturing garments for different customers

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2. Explain two benefits to Uniform Plus + of using technology in their production of garments

   a.

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   b.

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3. Explain one way which 3D printing helps Uniform Plus + meet the needs of their customers

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# Worksheet F: *continued*

4. How has Uniform Plus+ tried to improve labour productivity?

    a. Method 1

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    b. Method 2

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5. What other methods could they use to improve labour productivity?

    a. Method

    1……

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    b. Method

    2……

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6. Recommend a way that Uniform Plus + can ensure high quality standards are met for all of their garments

    Step 1 – What is the question asking?

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# Worksheet F: *continued*

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Step 2 – What methods of ensuring quality do you know?

Method 1

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Method 2

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Step 3 – What are the advantages and disadvantages of method 1 (make specific links to the case study)?

Advantages

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Disadvantages

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# Worksheet F: *continued*

What are the advantages and disadvantages of method 2 (make specific links the case study)?

Advantages

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Disadvantages

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Step 4 – Using your notes, recommend a way Uniform Plus+ can ensure high quality standards are met for all the garments it makes

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# **Worksheet G:** Key terms

Match the key terms below the table to the correct definition.

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|---|---|
| | A Japanese term which means continuous improvement |
| | A stock control system where very little stock is kept and supplies arrive just before they are needed for manufacturing |
| | Costs that do not change with output |
| | Output per unit of labour input |
| | A method of ensuring quality by inspecting the finished good or service before it is delivered to the customer |
| | The cost of producing one unit of a good or service |
| | A production process which involves making a unique good or service to meet the customer's specific requirements |
| | A production process where a group of identical products are produced before production is switched to another group of identical products |
| | Large scale production of identical items where operation on units is performed continuously, usually on a production line |
| | A method of ensuring quality through checking units at each stage of the production process and involving workers at each stage in production |

**Key terms**

| | | | |
|---|---|---|---|
| JIT | Kaizen | Fixed costs | Labour productivity |
| Quality control | Average cost | Job production | |
| Batch production | Flow production | Quality assurance | |

# **Worksheet H:** Operations case study 1

## Scenario

Good Sleep plc make mattresses. It is an established business and operates from a small factory in the US. It employs twelve staff and has recently appointed a new operations manager. In 2017 the then manager retired after 25 years of service to Good Sleep plc. He was replaced by the current manager, Dave Jones.

Within two months of the new manager arriving significant changes were made to production methods and working practices. The new manager emphasised the importance of production targets, quality, unit costs, staff involvement and efficient operations management.

In his drive to reduce unit costs, Dave Jones introduced a Kaizen philosophy to Good Sleep plc to raise productivity and reduce waste.

Table 1 shows some financial information for Good Sleep plc

| | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|
| Total output | 12 000 | 13 500 | 14 000 | 17 000 |
| Total Cost | 252 000 | 297 000 | 305 200 | 297 500 |

1. Calculate the unit costs for each of the for years

| 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|
| | | | |

2. What impact has the new production manager Dave Jones had on unit costs?

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3. Explain how a Kaizen system may have contributed to the change in unit costs.

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# Worksheet H: *continued*

4. Explain what the impact of introducing a quality assurance system may have had on unit costs.

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# **Worksheet I:** Operations case study 2

## Scenario

Colour Coil plc is one of the largest independent paint coating manufacturers in the world. They specialise in the organic coating of steel and aluminium coils for business use. Colour Coil plc offer a wide range of protective finishes and colours to suit their customers' requirements. The company has the ability to produce both extremely low and high volume quantities to meet a variety of order sizes for different industrial customers. They offer a wide range of colours and short lead times and supply major DIY chains, car manufacturers and a range of home furnishing chains with colour coated metal.

The original stock control and sales processing system was implemented in the 1990s. Since then Colour Coil plc's business model has undergone significant changes. The old system, with its aging technology, no longer met the needs of the business in this highly competitive industry. The company needed to invest in new technology. A company called CompuServe developed two highly sophisticated systems for Colour Coil plc – a sales order processing system and a stock control system. The new system efficiently manages Colour Coil plc's complex product portfolio. This consists of many variables such as stock codes, materials and colours. The computerised stock control system allows Colour Coil plc to run on a Just In Time basis.

The new systems were designed to work alongside another sophisticated software package for the firm's accounting. This has reduced administration time and costs by avoiding the need for multiple data entry, as when something is purchased both the accounting software and CompuServe software records the purchase amount and begin the production process automatically. The customer's order is passed directly to the production machinery through the software, and robots select the right size coils from the warehouse bins, forward them to the painting and drying robots who deliver them to the packing area. Quality is monitored by the robots at every stage using lasers and chemical analysis equipment. This has meant that the production process has changed from being labour intensive to not needing many workers.

Colour Coil plc has achieved a sustainable competitive advantage through its quick order fulfilment times. Improved administration has enhanced that advantage through the linking of the software systems. From a customer service point of view, the new systems provide the firm with the ability to monitor stock efficiently and satisfy customer demand with low minimum order quantities and fast delivery.

1. Explain what a Just In Time stock ordering system is.

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# Worksheet I: *continued*

2. Explain the impact on Colour Coil plc of implementing the computer software systems for its sales, production and accounting functions.

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3. Evaluate the impact of automation on Colour Coil plc's production processes.
   Step 1 – Identify the advantages to Colour Coil plc of using an automated production process.

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# Worksheet I: *continued*

Step 2 – Identify the disadvantages to Colour Coil plc of using an automated production process.

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Step 3 – In your opinion, is it better for Colour Coil plc to have an automated production process or not? Justify your answer.

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# Worksheet A: Answers

Read the question and answers below. Underline or highlight where you think good application is being shown.

Here are some reminders about application:

- In the exam, you are often provided with some information about the business the question is focussed on. For example, you might be told the type of business, its future plans, how many employees there are etc.
- To ensure you are applying your business knowledge, you will need to focus your answer on the specific business mentioned in the question.
- This means your answer will be in **'context'**.
- You will need to use the information given, when answering questions to help demonstrate that you are applying your knowledge.

George and Catherine have both just completed a bakery course at their local college. They plan to set up their own baking business by selling bread rolls to the canteen at their old school as well as making specialty cakes for birthdays and weddings.

Recommend which methods of production they should use.

**Answer 1**:

*I recommend that George and Catherine use batch production to make their product because groups of identical products can be made at the same time which can save time and money for a business. The cakes should be job production which means that each product is a one off for a customer.*

The only contextual evidence is the use of the example of cakes.

**Answer 2**:

*I recommend that George and Catherine use batch production to make the bread rolls for their old school canteen because groups of identical products can be made at the same time which means that the canteen can get as many of that type of roll as they want.*

*The speciality birthday and wedding cakes should be job production which means that each product is a one off for a customer like a bride who wants her own design and colours.*

Much more use of the context of the case study, this shows what the business is making and what market they are operating in.

# Worksheet B: Answers

**Statement 1**

*Job production is helpful because it allows one off products to be made which meet individual customers' needs.*

I know this statement has not been made in a business context because *there is no information about the business*

**Statement 2**

*Sarah is using job production to create her highly decorated pottery plates which people buy as presents after she has decorated them with names, places and dates to meet the customers' requirements.*

I know this statement has been made in a business context because *we can see specific information about the business*

**Statement 3**

*I would recommend that Ed's Bakery uses batch production to produce a range of bread and cakes for distribution to shops within a 20-mile radius. This means more can be produced than if Ed used job production. A problem with this is that the business needs to stock enough ingredients like flour and sugar to make the different kinds of bread, which costs money.*

I know this statement has been made in a business context because *we can see what market the business is in and its special circumstances*

**Statement 4**

*They should use batch production because that is the normal way for this product to be made.*

I know this statement has not been made in a business context because *there is no information about the business*

# Worksheet B: Answers *continued*

**Statement 5**

*Kaizen means involving and encouraging workers to make suggestions for small, frequent improvements which add up to huge increases in operational efficiency.*

I know this statement has not been made in a business context because *there is no information about the business*

**Statement 6**

*The costs of holding three weeks supplies of flour, sugar, salt and oil were reducing the profits of BakeitWell Family Bakers until they moved to a JIT stock system which meant they only kept two days' worth of supplies at any one time.*

I know this statement has been made in a business context because *we have specific information about the business and its circumstances*

# Worksheet C: Answers

| Exam style answer | Case study |
|---|---|
| *Bernard Le Glas uses job production to make hand crafted wooden furniture to meet specific customer orders for dining chairs.* | The Coppicing Cooperative is a small business run by like-minded people who feel passionately about the care of woodland and aim to create sustainable products through a technique called coppicing. This involves certain types of trees being cut back to the trunk to encourage the plant to produce new wood. The wood that is cut is used to make charcoal and bespoke wooden furniture to customers' orders. |
| *The advantages of making different products by using batch production are that the needs of different customers can be met.* | Colour Show Paints plc makes a range of paints used for home decorating. They make different finishes of paint like silk and matte emulsions, gloss paint and primers in a wide variety of different colours. The ingredients including pigments are mixed to make the right type and colour then the put into cans in the canning room, then the label and lid are pressed into position. Once that group of paints has been manufactured, the factory switches to make a different type and colour of paint. |
| *Batches are made to meet the needs of specific developments by making one model suited to the local conditions. Using batch production in this way can also reduce costs because larger quantities of materials can be bought which means the firm can negotiate a better discount from supplier.* | Square Deal Homes Ltd specialise in building energy efficient new homes with solar panels and grey water capture systems to use water from baths and kitchen sinks to water the plants in each house's garden. They build one model of their energy efficient home on a new housing estate, then switch to another model on another housing estate. |
| *An advantage of flow production is that large amounts can be made continuously using automation. This means that unit costs will be very low as the ingredients and the labour costs will be very small.* | Easy Cook Food plc has one of the world's largest canning facilities just outside of Wigan in the UK. Over 1 billion tins of baked beans are made continuously by mixing the beans with the sauce, putting the mixture into tins then sealing the tins. The tins then move to an oven where the beans are cooked inside the tins. Conveyor belts move the tins through a cooling and labelling area. Tins of beans are made every day throughout the year. |
| *While it is very expensive to set up a production line with robots, the business can still make cost savings because the firm will benefit from economies of scale. This means that each item is cheaper to make because there are low labour costs. The quality will also be better as the robots are always accurate.* | Cute Cars plc mass produces their 4 seat, fuel efficient cars on an automated assembly line. The cars move along a conveyor belt and different robots undertake the welding and assembly as well as the final painting at the end of the manufacturing process. |
| *An advantage of job production is that the end result is high quality, it meets the specific needs of customers and the workers will get more satisfaction from working on the item from start to finish.*<br>*A disadvantage is that the labour costs will be higher as a skilled worker and specialist equipment are expensive.* | Miles Harper is a well-known wedding photographer. Before each wedding he has several meetings with the bride and groom to determine the style of photographs he should take to best meet their needs and so they can relax on their big day knowing he will take all the group shots and formal pictures they require. |

# Worksheet D: Answers

Select the best answer for the following questions:

1. Jennifer Jones makes and ices wedding cakes for brides. Which method of production is she most likely to use?
   - ☐ Job production
2. Walsall Bakery uses batch production to make its bread. Which of the following is a disadvantage of this production method?
   - ☐ It may have to limit the range of bread it can offer
3. Which of the following is **not** an example of automation?
   - ☐ The sewing of a wedding dress by hand
4. Which of these statements is true about the importance of quality?
   - ☐ It is easy to lose a reputation if products are low quality
5. Productivity is best described as:
   - ☐ A measure of output per unit of labour input
6. Which of these is **not** a way to increase productivity?
   - ☐ Purchase less expensive, older machinery
7. Which of the following statements is an **advantage** of Just In Time stock control?
   - ☐ Eliminating buffer stock cuts storage space, allowing for more sales or manufacturing space
8. Which of the following statements about quality assurance is **true**?
   - ☐ There may be less wastage and this will reduce production costs
9. Which of the following statements is an **advantage** of quality control?
   - ☐ It can help prevent faulty goods and services being sold

# Worksheet E: Answers

| Production Activity | Method of production | Reason for recommendation | Possible problem |
|---|---|---|---|
| A specialist tailor makes made to measure men's suits. | Job | The tailor can make each suit to the exact measurements of the client, giving a better service than clothes bought in a store. | The tailor can only cut out one suit from fabric at a time so produces less. Costs will be higher to pay for the skilled labour and more fabric may have to be held in stock to meet different customers' tastes. |
| An expensive sports car manufacturer produces cars to order for wealthy clients who want a unique product. | Job | As the cars are made to order for wealthy clients they are job production. The cars meet the exacting requirements of each customer, giving greater customer satisfaction. | The car manufacturer will not be able to make many models at the same time so costs will be higher. |
| A multinational car company produces large numbers of cars in Germany to export to the rest of the world. | Flow | Flow production involves making lots of identical products, in this case the model of car. Many cars need to be made of the same quality. | The needs of different customers will not be met as there will be little choice of colour and other features. |
| A local bakery produces a range of bread, rolls and cakes for distribution to shops within a 20 mile radius. | Batch | Groups of different breads can be made before the bakery switches production to another type so batch is the best production method. Different flavours of cake can be made to meet the needs of different customers. Costs will be lower than with job production and more bread and cakes | Production time is lost when switching from one type of bread to another. Workers may find the work repetitive and boring.<br>The business needs to stock enough ingredients like different flours, to |

| Production Activity | Method of production | Reason for recommendation | Possible problem |
|---|---|---|---|
| | | can be produced than if they were made one at a time. | make the different kinds of bread, which costs money. |
| An office furniture manufacturer produces wooden furniture to order for unusual spaces. | Job | This is a bespoke product which needs to be made to meet the exact measurements of the office space to meet needs of the customer. This will give greater customer satisfaction than badly-fitting desks and computer stations from another type of supplier. | The furniture will be costly to produce as it will need to be cut to the exact dimensions instead of being able to be cut to set sizes which can be used for other jobs. |
| A sugar refinery produces hundreds of tons of sugar each day through an automated process that takes place 365 days a year. | Flow | It will be possible to produce the sugar using a highly automated production line which will keep costs down. The quality of the sugar should be high as computers can measure temperatures during the production process and ensure all the sugar is consistent. | It will be expensive to set up the production line with automated equipment.<br>The firm will need to arrange for raw materials like sugar beet or sugar cane to be delivered regularly as needed.<br>Monitoring the sugar as it passes through the factory can be boring for workers. |
| A brewery produces hundreds of bottles of beer daily. The bottles are washed, filled, capped and labelled by machinery using a conveyor belt system. | Flow | It will be possible to produce the beer and bottle it using a highly-automated production line, which will keep unit costs down. Machines can work at a faster bottling rate than a human and measure the beer into each bottle accurately. | It will be expensive to set up a bottling plant with conveyor belts, robots and automated machinery.<br>The firm will need to arrange for raw materials like hops, barley, glass bottles and paper for the labels, to be |

| Production Activity | Method of production | Reason for recommendation | Possible problem |
|---|---|---|---|
| | | | delivered regularly as needed. The work can be boring as it will just involve packing the bottles. |
| A small company produces three models of caravan, each requiring a different steel frame. The company makes one model at a time then switches production to another model. They have found a way to use the same cooker, fridge and shower components for all the models. | Batch | Since quantities of the different types of kitchen and shower components are used, the firm can make batches of each type. This will speed up production and reduce costs. The firm can meet the needs of different customers by making different models while saving time. The work will be less repetitive than flow production. | Batch may require stocks of the cookers, fridges and shower components which will cost money to store. The work will be slower than flow production as the firm needs to switch between the different models of caravan. |

# Worksheet F: Answers

## Scenario 1

Cute Cars plc is a business that manufactures small, fuel efficient cars in a variety of fashionable colours. They aim to keep control of their costs of production and have noticed that their productivity is not as good as one of their competitors, Adorable Autos plc.

1. Calculate the productivity of each car manufacturer

| Car Manufacturer | Staff | Output (Cars) per year | Productivity (cars per worker per year) |
|---|---|---|---|
| Cute Cars plc | 27 000 | 110 000 | 4 cars per year |
| Adorable Autos plc | 2 750 | 270 000 | 98 cars per year |

## Scenario 2

Uniform Plus+ was established in 2020 and has become a leading supplier of work wear, school uniforms, leisure wear and promotional clothing. They supply schools and businesses with a range of uniforms and branded clothing items like polo shirts with the name and logo of specific companies. The have recently moved to a new purpose built facility incorporating their head office and factory. Uniform Plus + manufactures over 12 000 garments a week and supplies more than 5 500 customers.

The factory has a new 3D printing system to help meet the specific needs of the schools and other businesses they supply. The stock ordering system is also computerised to ensure that they can function on a Just In Time basis which helps keep costs down and saves space in the factory.

Uniform Plus + has invested in the latest technology such as advanced sewing machines which allow staff to overlock and put logos on in embroidery as soon as they have finished the seams. These and the new cutting robots have increased productivity for the business.

As Uniform Plus + are supplying different kinds of business they are very concerned that they maintain the highest quality standards so that they do not get a reputation for poor quality which might make them lose business.

# Worksheet F: Answers, *continued*

2. Explain which method of production Uniform Plus + is likely to use when manufacturing garments for different customers

   *Uniform Plus+ is most likely to use batch production when making school and work uniforms because they can cut out groups of the same size garment, sew groups of the same size as well as putting the logo on in groups.*

3. Explain two benefits to Uniform Plus + of using technology in their production of garments

   a. *Technology can help them keep costs down by reducing waste from human error when designing garments.*

   b. *Technology can improve productivity by allowing workers to get more work done in less time because the sewing and cutting equipment is better.*

   c. *Technology can help keep the quality high through measuring fabric and cutting garments more accurately.*

4. Explain one way which 3D printing helps Uniform Plus + meet the needs of their customers

   *3D printing will help Uniform Plus + to make prototype products and finished products. 3D printing can allow Uniform Plus + to personalise and customise t-shirts to meet the specific demands of its customers.*

5. How has Uniform Plus+ tried to improve labour productivity?

   a. Method 1 *They have invested in up to date machinery like the new sewing machines.*

   b. Method 2 *They have invested in the cutting robots to improve accuracy which should lead to less wasted fabric.*

# Worksheet F: Answers, *continued*

6. What other methods could they use to improve labour productivity?

    a. Method 1 *Uniform Plus + could try to motivate workers through financial methods like piece rate pay and non-financial ones like employee of the month awards to encourage them to work harder and faster.*

    b. Method 2 *Uniform Plus + could implement a Kaizen approach and ask staff to suggest improvements to how the garments are made in order to increase efficiency.*

7. Recommend a way that Uniform Plus + can ensure high quality standards are met for all of their garments.

    *Uniform Plus + could use a system of quality control where the finished product is inspected to make sure there are no faults before it leaves the factory. An inspector could check the seams of a sample of school uniform, check the hem lengths and that the logos are all identical before an order is completed.*
    *An advantage of this is that it will help prevent faulty uniforms being shipped to schools and business customers as this would damage their reputation. A disadvantage is that by the time the goods are finished it is too late to fix any quality problems and the garments will have to be made again from new material.*
    *Uniform Plus + could also use quality assurance which aims to prevent problems with quality by monitoring and assessing quality throughout the production process rather than just at the end. An advantage of this is that quality problems are discovered before the school uniforms are finished so helps there be less wastage as the garment can be fixed rather than having to be discarded. Workers may be motivated and feel valued if they are given responsibility for quality control. A disadvantage is that production could be slower as workers will have to stop sewing to check each garment before sending it onto the next stage.*

    Learners can choose to recommend either quality assurance with reasons or quality control with reasons. The answer must be in the context of Uniform Plus+ making garments for schools and businesses.

# Worksheet G: Answers

| | |
|---|---|
| Kaizen | A Japanese term which means continuous improvement |
| JIT ( Just in time) | A stock control system where very little stock is kept and supplies arrive just before they are needed for manufacturing |
| Fixed costs | Costs that do not change with output |
| Labour Productivity | Output per unit of labour input |
| Quality control | A method of ensuring quality by inspecting the finished good or service before it is delivered to the customer |
| Average costs | The cost of producing one unit of a good or service |
| Job production | A production process which involves making a unique good or service to meet the customer's specific requirements |
| Batch production | A production process where a group of identical products are produced before production is switched to another group of identical products |
| Flow production | Large scale production of identical items where operation on units is performed continuously, usually on a production line |
| Quality assurance | A method of ensuring quality through checking units at each stage of the production process and involving workers at each stage in production |

# Worksheet H: Answers

## Scenario

Good Sleep plc make mattresses. It is an established business and operates from a small factory in the UK. It employs twelve staff and has recently appointed a new operations manager. In 2017 the then manager retired after 25 years of service to Good Sleep plc. He was replaced by the current manager, Dave Jones.

Within two months of the new manager arriving some sweeping changes were made to production methods and working practices. The new manager emphasised the importance of production targets, quality, unit costs, staff involvement and efficient operations management.

In his drive to reduce unit costs, Dave Jones introduced a Kaizen philosophy to Good Sleep plc to raise productivity and reduce waste.

Table 1 shows some financial information for Good Sleep plc

| | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|
| Total output | 12 000 | 13 500 | 14 000 | 17 000 |
| Total Cost | 252 000 | 297 000 | 305 200 | 297 500 |

1. Calculate the unit costs for each of the for years

| 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|
| £21.00 | £22.00 | £21.80 | £17.50 |

2. What impact has the new production manager Dave Jones had on unit costs?

   Dave Jones has brought unit costs down from £22.00 to £17.50, a 20% decrease in costs.

3. Explain how a Kaizen system may have contributed to the change in unit costs.

   Kaizen is a Japanese term which means continuous improvement. The Kaizen system consists of a wide range of concepts involving everyone in a firm contributing to the quality and efficiency of production.

   This may have changed unit costs for Good Sleep plc by getting production workers to make suggestions on how to improve production techniques for the mattresses and speed up the production process like moving to a Just in Time stock control system so staff are not waiting for the right fabric, springs or mattress filling. Staff are in charge of identifying areas where staff feel they could have more training in order to improve their efficiency like moving the mattress from one work area to another or the use of more sophisticated sewing machines.

# Worksheet H: Answers, *continued*

4. Explain what the impact of introducing a quality assurance system may have had on unit costs.

   *Staff are in charge of monitoring the quality of the mattresses while they are being produced, like checking the mattress filling was evenly distributed before being passed to the next stage of production. Sewing staff could be more responsible for monitoring their own quality which motivates them to work harder and reduces wasted fabric used to cover the mattresses by getting it right first time with zero wastage which reduces costs. If all the staff in all the stages of producing the mattresses are involved in monitoring their own quality, then fewer assembly and sewing mistakes will be made and costs will go down.*

# Worksheet I: Answers

1. Explain what a Just In Time stock ordering system is

   *Just In Time is a stock ordering system where supplies are delivered to the manufacturer just before they are needed which removes the need for large storage spaces in manufacturing facilities. Metal coils and colour ingredients will be delivered to Colour Coil as they are needed for an order to be processed, so when Colour Coil gets an order for a batch of items, an order for the supplies is sent to their suppliers who will have to respond very quickly to replenish stocks at Colour Coil plc. This means they don't need to have a large warehouse for storing metal coils which ties up funds from the business.*

   Ensure that learner answers relate specifically to the business context and mention specific issues from the case study.

2. Explain the impact on Colour Coil plc of implementing the computer software systems for its sales, production and accounting functions

   *Some of the impacts on Colour Coil plc of implementing the computer software system for its sales, production and accounting function are:*

   a. *they can fill order quickly as the order is passed directly to the production robots*
   b. *they can they can monitor quality easily as the robots are programmed to measure the thickness of the paint coating and test chemically for the right colour match*
   c. *accounting is more efficient as the software packages are linked so an accountant doesn't have to go through the orders to include each one in the balance sheet*
   d. *communication is better with customers as an automated email can be sent confirming the order and allowing customers to track its progress which could be important as they may be selling to other large businesses.*

# Worksheet I: Answers, *continued*

3. Evaluate the impact of automation on Colour Coil plc's production processes

*Step 1 – Advantages of automation include:*

a) *a reduction in costs as the sales and production system are linked through the CompuServe software and production is carried out by automated machinery and robots in their production facility*

b) *quality will also be improved through the use of automated equipment as human error is removed and the production robots can measure their work with laser technology. Machinery is more consistent than humans are, so the colours and coating on the metal coils will be to a high quality standard every time*

c) *increased productivity which means more coloured coils can be produced with fewer resources so Colour Coil plc will be more profitable*

d) *reduced waste because the automated machinery including the production robots will not make the same amount of mistakes as human workers would so fewer coils will need to be rejected*

e) *improved working environment as new technology and automation leads to fewer accidents as robots undertake the work like spray painting which may have harmed workers. Automated machinery can complete boring repetitive tasks that workers find dissatisfying like loading coils manually.*

*Step 2 – Disadvantages to Colour Coil plc of increased automation include:*

a) *costs to Colour Coil plc of buying the automated machinery and robots will be significant as well as the cost of the software needed to run them. There will also be ongoing costs of specialist engineers needed to maintain the robots and machinery*

b) *labour relations may be strained as workers who previously made and painted the coloured coils have had their jobs replaced and it is likely that not all of them would have found a different kind of job working for Colour Coil plc*

c) *different job skills will be required with more automation and the existing workforce would need retraining or to be made redundant*

d) *automated production lines are interdependent and if part of the production line breaks down the whole process may stop. This can cause a significant delay in meeting orders and cause customer service problems for Colour Coils plc if one of their business customers then can't meet their own deadline for an order as the coil they need from Colour Coils plc is late*

# Worksheet I: Answers, *continued*

e) managing new technology is considered very difficult as the pace of change is accelerating and new technology will soon become obsolete and need to be replaced, like the software from Compuserve will need frequent updating and newer machinery and robots will have to be bought as the present ones become out of date.

f) IT problems can be significant as if a virus infects the computers at Colour Coil plc they may be unable to accept orders, receive payment and instruct the automated machinery and robots to produce any coils.

Step 3 – In your opinion, is it better for Colour Coil plc to have an automated process or not?

Learners should be able to make a judgement based on their identification of the advantages and disadvantages to Colour Coil plc. Most learners should be able to argue that the advantages of lower unit costs, less waste and a safer, improved working environment outweigh the possible job losses and costs of new technology. The main focus should be on using their subject knowledge in the context of an industrial manufacturing business supplying other business with a valuable component.

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