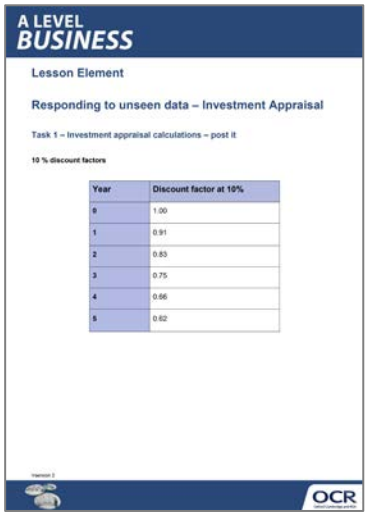
A LEVEL BUSINESS

Checkpoint Task

Responding to unseen data – Investment Appraisal

Instructions and answers for teachers

These instructions should accompany the OCR resource 'Responding to unseen data – investment appraisal' activity *which supports OCR A Level Business.*


A LEVEL BUSINESS

Lesson Element

Responding to unseen data – Investment Appraisal

Task 1 – Investment appraisal calculations – post it

10 % discount factors

Year	Discount factor at 10%
0	1.00
1	0.91
2	0.83
3	0.75
4	0.66
5	0.62

OCR

The Activity:

Responding to unseen data – investment appraisal

This activity offers an opportunity for English skills development.

This activity offers an opportunity for maths skills development.

Associated materials:

'Responding to Unseen Data – Investment Appraisal' Learner activity sheet

'Responding to Unseen Data –Investment Appraisal' Teacher's PowerPoint slides

Suggested timings:

Task 1: 20-30 minutes

Task 2: 10 minutes

Task 3: 60 minutes

Version 2

Overview

Business investment decisions are not based on investment appraisal calculations alone; other quantitative and qualitative information needs to be taken into account. The A level specification requires students to be able to:

- Calculate and interpret quantitative methods of investment appraisal: the payback period, average rate of return (ARR) and net present value (NPV).
- Evaluate the usefulness of different methods of investment appraisal to a business and its stakeholders.
- Recommend and justify business investments based on quantitative and qualitative investment appraisal.

The decision-making activity 'Which Investment?' develops candidates' ability to recommend and justify appropriate business investments taking into account a range of quantitative and qualitative factors. In the examination students need to be able to absorb the previously unseen stimulus material and factor into their decision-making as many aspects of the business as possible. This 'Which Investment?' activity helps students develop the skills of responding to unseen investment appraisal data and justifying appropriate decisions. The activity should be undertaken once students are familiar with the mathematical calculations of the three investment appraisal methods given in the specification (payback, ARR and NPV) and after consideration of the relative strengths and weaknesses of each method. It is recommended that students recap both of these areas before undertaking the decision-making activity. Tasks 1 and 2 have been developed for this purpose.

Task 1 - Investment appraisal calculations Post-it

This activity can be used to recap how to calculate payback period, ARR and NPV in preparation for *Task 3 "Which investment?"* The activity encourages students to work with precision and speed. The declaration of results, using post it notes, introduces an element of competitive interest.

Task Description

Each student will need:

- Paper and pens
- Calculator
- 10% discount factor table
- 1x Post-it note

Three areas should be allocated in the classroom for students to stick their post it notes (preferably at the back of the room so that students are not distracted while working out the calculations).

This could be 3 pieces of card, three areas of a notice board or three flip charts (or whatever is convenient). The three areas should be labelled 'Machine A', 'Machine B' and 'Machine C'. The teacher should ask each candidate to write their name on the Post-it note before the activity begins. The teacher should explain that data will be displayed about three machines which a company is considering purchasing. The students' task is to calculate the payback period, ARR and NPV (discount factor 10%) for each of the three machines and decide which machine the company should purchase. When they have made their decision they should write the payback period, ARR and NPV of their chosen machine on the post it note and stick it in the appropriate area. Introducing a time element may help in some classes.

The teacher should display the resource data and encourage students to work as quickly and accurately as possible. While the class is working the teacher could move around the class assisting anyone who is struggling with the calculations (it may be helpful if such students are allowed to use their previous notes). Once all post it notes have been declared the teacher can ask selected students to give feedback on the reasons for their decisions. The teacher could also check which of these students correctly calculated the payback period, ARR and NPV. Three students can then be chosen to go over the calculations on the board for the benefit of the rest of the class if necessary.

Task 2 - Usefulness of investment appraisal techniques - card sorting activity

The student worksheets include a template for three title cards and 27 descriptions (9 for each investment appraisal method). These are best photocopied onto coloured card and laminated -the cards should be cut out and placed in envelopes or plastic wallets. Students should try and match the strengths and weaknesses to the investment appraisal techniques.

This activity works best in pairs or in small groups. The teacher can use the opportunity to walk round the classroom assisting students as necessary.

Task 3 - Which investment? – decision-making activity

The aim of this activity is to help students understand that decisions are not purely based on calculating the numerical results of the three investment appraisal techniques. Other quantitative and qualitative factors need to be taken into consideration before deciding on the correct option to recommend. In the examination a student may well need to balance a wide range of factors given to them in the stimulus material and make a justified decision. Any decision which is fully justified is acceptable but the justification must be logical and be appropriate for the particular circumstances in which the particular business finds itself.

Task Description

The task is split into two parts. In Part A the students are asked to present an argument for one of the projects under consideration. In Part B the students are introduced to a range of other factors and asked to consider what effect these would have on the investment decision. It is beneficial if the class work through these scenarios at the same rate so that the teacher can provide the appropriate feedback at each stage. The scenarios have been designed to have an inclining level of difficulty.

Each student will need a set of decision cards – Project A, Project B or Project C. It would help if each of these were printed on a different coloured card, so that the rest of the class can judge the spread of opinions. Begin by giving students adequate time to complete Task A (it could be set for homework in the previous lesson). Next, display the first scenario and ask students to consider what effect this may have on the investment decision. Students should complete the appropriate worksheet stating their recommendation and supporting justification. When requested, students should raise the appropriate decision card. The teacher can then discuss the findings before moving on to the next scenario. Work through as many scenarios as time permits.

If preferred, the activity could be conducted with students working in pairs or in small groups. Additional scenarios can be set for homework if required. At the end of the activity it would be helpful for the teacher to reinforce that in the examination the student needs to take into account as many of the given factors in the stimulus material as possible and not make investment decisions purely on the basis of the investment appraisal calculations.

Task 1 Resource Material

	Machine A	Machine B	Machine C
Year 0 (cost)	(£300.000)	(£500.000)	(£1200.000)
Year 1	£60.000	£100.000	£50.000
Year 2	£240.000	£200.000	£150.000
Year 3	£240.000	£400.000	£900.000
Year 4	£240.000	£450.000	£1 200.000

Task 1 Answers

	Machine A	Machine B	Machine C
Payback period	24 months	30 months	37 months
ARR	40%	32.5%	22.92%
NPV	£297.000	£363.000	£461.000

Task 1 Workings

	Payback period	ARR
Machine A	Cost £300 000 = £60 000 (year 1) + £240 000 (year 2) = 2 years or 24 months	Cash inflow = £60 000 + £240 000 + £240 000 + £240 000 = £780 000 Cash inflow – cost = £780 000 - £300 000 = £480 000 £480 000/4 years/£300 000 cost x 100 = 40%
Machine B	Cost £500 000 = £100 000 (year 1) + £200 000 (Year 2) + £200 000/£400 000 (year 3) = 2.5 years or 30 months	Cash inflow = £100 000 + £200 000 + £400 000 + £450 000 = £1 150 000 Cash inflow – cost = £1 150 000 - £500 000 = £650 000 £650 000/4 years/£500 000 cost x 100 = 32.5%
Machine C	Cost £1 200 000 = £50 000 (year 1) + £150 000 (year 2) + £900 000 (year 3) + £100 000/£1 200 000 (year 4) = 3.083 years or 37 months	Cash inflow = £50 000 + £150 000 + £900 000 + £1 200 000 = £2 300 000 Cash inflow – cost = £2 300 000 - £1 200 000 = £1 100 000 £1 100 000/4 years/£1 200 000 cost x 100 = 22.9%

NPV

Year	Machine A	Machine B	Machine C
	£	£	£
0	(300.000)	(500.000)	(£1200.000)
1	54.600	91.000	45.500
2	199.200	166.000	124.500
3	180.000	300.000	675.000
4	163.200	306.000	816.000
TPV	597.000	863.000	1661.000
NPV	297.000	363.000	461.000

Task 2 – Answers

Column A = Payback Column B = ARR Column C = NPV

Payback	ARR	NPV
Indicates length of time the capital outlay is at risk	Measures the financial return on a project	Makes an allowance for the opportunity cost of investing
Biased in favour of short-term projects	Allows the direct comparison of returns	Takes into account the timing of cash flows
Particularly important if firm has cash flow difficulties	Of particular interest to owners/shareholders	Considers the time value of money
Relevant to firms who need quick returns	Ignores the timing of cash flows	Very difficult to be accurate in the long term
Ignores the timing of cash flows	Does not account for fluctuations in returns	Complex calculations, easily misunderstood

Payback	ARR	NPV
Excludes income after payback	Important when profitability, rather than cash flow, is an issue	Does not compare expected returns with the cost of investment
Does not calculate financial returns	Shows investment yield	Shows absolute increase/decrease in wealth
For valid comparisons to be made options need to have similar levels of start up capital	Gives percentage return	Takes into account the effects of inflation
Of particular interest to banks and other lenders	Calculates returns without relying on the need to choose an accurate discount rate	Can validly compare investments with significantly different amounts of start up capital

Task 3 Resource Material

	Project A	Project B	Project C
Initial cost	£440.000	£60.000	£120.000
Payback period	3.25 years	2 years	1.5 years
ARR	52%	100%	67%
NPV (15% discount factor)	£750,000	£450,000	£240,000

Scenario 1	The company is experiencing significant cash flow difficulties which are affecting its ability to gain further finance from its bank.
Scenario 2	Many of the company's shareholders are threatening to sell their shares if share dividends do not increase in the next few years.
Scenario 3	The company is new and the shareholders are willing to take risks for potential high returns.
Scenario 4	The directors of the company are risk averse. They are cautious and experienced. Option C involves diversification.
Scenario 5	The company operates in a market which is subject to rapid change, especially beyond year 3.The company has no cash flow problems and the investors want high returns.
Scenario 6	The company trades on its ethical and socially responsible branding. Project B would not be perceived by the public as environmentally friendly.

Task 3

Part B – Teacher resource suggested implications on investment decisions

Scenario	Suggested implications on investment decision
1 The company is experiencing significant cash flow difficulties which are affecting its ability to gain further finance from its bank.	The company needs a quick return. The size of any return is less important than the speed of the return. Further cash flow difficulties may mean it has to cease trading. In order to minimise the risk of this happening the company should choose the option with the shortest payback (Project C) especially as it is unlikely that it will be able to borrow money from the bank to fund the project.
2 Many of the company's shareholders are threatening to sell their shares if share dividends do not increase in the next few years.	Without its shareholders' investment the company is likely to experience future difficulties (especially if it is a private limited company). Since the size of dividends agreed is normally linked to available profit, the percentage yield of the investment is of great importance. The company should choose the option with the highest predicted ARR (Project B)
3 The company is new and the shareholders are willing to take risks for potential high returns.	All businesses take a risk in order to gain reward. In these circumstances the shareholders are willing to take high risks for potential high rewards. They are not risk averse. The company should choose the maximum predicted return on wealth. It should take the option with the highest NPV (Project A).
4 The directors of the company are risk averse. They are cautious and experienced. Option C involves diversification.	When directors are risk averse a company would normally choose the option with the shortest payback period. However in this case, Project C which has the shortest payback period, involves diversification. Diversification is deemed to be high risk because the company would be entering a new market with a new product with considerable uncertainty attached to any decisions made. In this case Project C should be avoided and the company should choose between the other two projects. Since Project A is far more expensive and dependant on the accuracy of the NPV discount factor which has been used to calculate the returns it would be most appropriate for the company to choose the option with the highest ARR (Project B).

5 The company operates in a market which is subject to rapid change, especially beyond year 3.The company has no cash flow problems and the investors want high returns.	Investors wanting high returns would suggest the company should choose an option with high returns (absolute wealth NPV or percentage yield ARR). The speed of returns is a secondary consideration, especially since there are no cash flow issues. Given that NPV relies on choosing the correct discount rate and on the fact that a discount rate of only 15% was used this might not be sufficient to account for the considerable uncertainty in a rapidly changing market beyond year 3. The company should avoid relying on the NPV prediction and choose the option with the highest ARR (Project B).
6 The company trades on its ethical and socially responsible branding. Project B would not be perceived by the public as environmentally friendly.	A company should not risk losing its USP or it may well lose the reason for its previous success. If this company sacrificed its ethical and social stance it may find that it loses shareholders as well as customers. Shareholders who have chosen to invest with the company because of its ethically responsible stance may no longer wish to be associated with the company. Despite the excellent ARR the company should avoid choosing an option which directly conflicts with the aims of the company. It should choose from the other two options (Project A or Project C). Further information such as cash flow position, profitability, size of available reserves, attitude to debt etc would be needed in order to advise this company on which of these two remaining projects to choose.