Simple and compound interest

How money grows, and how debt grows too

Answers and teaching notes

For the teacher

- **Aim:** Pupils calculate simple interest, build a compound interest table one year at a time, and see why time is the most powerful part of compounding, for savers and for borrowers.
- **Curriculum links:** Financial Education Planning Framework, ages 11 to 14: how to manage money (saving, interest and how money can grow) and managing risks and emotions (the cost of borrowing). Maths: percentages of amounts, percentage increase, simple interest in financial mathematics. PSHE: economic wellbeing.
- **Watch first:** the Penny Explains video "Compound interest" at pennyexplains.com.
- **Starter:** Ask: would you rather have £1,000 today, or 1p doubled every day for 20 days? (The doubling reaches £5,242.88 on day 20.) Growth on growth is the idea behind compound interest.
- **Support:** Find 5% by finding 10% and halving it. Do year 2 of the table together before pupils try year 3. Allow calculators.
- **Stretch:** Ask pupils to carry the table on to year 4 (interest £57.88, balance £1,215.51) and to explain why the interest gets bigger every year.
- **Activity 4 amounts:** £102, £105, £110, £110.25 and £121. **Activity 5:** the 5% rate is kept the same for 40 years only to make the sums clear. Real rates go up and down.
- **Total:** 41 points. Suggested answers are shown in red; accept any answer that is well reasoned.

I can...

- ☐ I can work out simple interest on savings.
- ☐ I can work out compound interest year by year in a table.
- ☐ I can explain why starting early matters, and why interest also makes debts grow.

Key words

Interest: the reward for saving, or the cost of borrowing.

Principal: the amount you first put in or borrow.

Simple interest: interest on the principal only.

Compound interest: interest on the principal plus the interest already added.

1 True or false?

4 points

Circle True or False. Rewrite the false ones so they are true.

With simple interest, you earn the same amount of interest every year.	**True**	False
5% of £200 is £20. **5% of £200 is £10. (10% is £20, and 5% is half of that.)**	True	**False**
With compound interest, you earn interest on your interest.	**True**	False
Interest is only ever paid to you. You never have to pay it. **You pay interest when you borrow money.**	True	**False**

2 Simple interest

8 points

Twins Zara and Idris, 13, are both savers. Show your working.

a) Zara puts £200 in an account paying 4% simple interest a year. How much interest does she earn in one year?

Working

1% of £200 = £2
4% = 4 × £2 = £8

Answer: £8

b) Zara leaves her £200 there for 3 years. How much will she have altogether?

Working

Interest: 3 × £8 = £24
£200 + £24 = £224

Answer: £224

c) Idris saves £350 at 2% simple interest a year for 4 years. How much interest does he earn?

Working

1% of £350 = £3.50, so 2% = £7 a year
4 × £7 = £28

Answer: £28

d) Interest works on borrowing too. Their cousin borrows £500 for one year at 20% simple interest. How much must she pay back?

Working

10% of £500 = £50, so 20% = £100
£500 + £100 = £600

Answer: £600

3 Compound interest, year by year

7 points

Gran puts **£1,000** into an account paying **5% compound interest** a year. Fill in the gaps.



Penny says: Each year's interest is added on, so the next year's interest is worked out on a bigger balance. To find 5%, find 10% and halve it. Round to the nearest penny.

Year	Balance at start	Interest (5%)	Balance at end
1	£1,000.00	£50.00	£1,050.00
2	£1,050.00	£52.50	£1,102.50
3	£1,102.50	£55.13	£1,157.63

a) **How much interest did Gran earn in total over the 3 years?** 1 mark

£157.63 (£1,157.63 − £1,000, or £50.00 + £52.50 + £55.13).

b) **With 5% simple interest she would have earned £150. How much extra did compounding give her?** 1 mark

£7.63 (£157.63 − £150).

4 Smallest to biggest

Challenge · 5 points

Each starts with £100. Number them by final amount: 1 for the smallest, 5 for the biggest.

5	£100 at 10% compound interest for 2 years
3	£100 at 5% simple interest for 2 years
2	£100 at 5% simple interest for 1 year
4	£100 at 5% compound interest for 2 years
1	£100 at 2% simple interest for 1 year

5 Why starting early matters

4 points

Read the story, then answer the questions.



Two cousins each save **£1,000** once and never add another penny. Both earn **5% compound interest** a year. **Ama** saves hers at age 15 and leaves it for 40 years: it grows to about **£7,040**. **Ben** saves his at age 35 and leaves it for 20 years: it grows to about **£2,653**.

a) How much more does Ama end up with than Ben? 1 mark

> £4,387 (£7,040 − £2,653).

b) Ama saved for twice as long as Ben. Did she end up with twice as much? Explain why. 3 marks

> No, she has much more than twice as much (2 × £2,653 = £5,306, and she has £7,040). In the extra 20 years her interest was earning interest on a bigger and bigger balance, so the growth sped up.

6 Interest word search

10 points

Find the words. They can go in any direction, even backwards.

P	R	I	N	C	I	P	A	L	N	C	D
B	A	P	E	R	C	E	N	T	M	Y	E
I	A	W	P	E	L	P	M	I	S	W	H
R	H	F	B	V	Y	S	O	U	U	O	N
S	G	N	I	V	A	S	F	E	P	R	F
H	R	A	B	A	L	A	N	C	E	R	W
I	N	T	E	R	E	S	T	U	D	O	S
F	B	E	A	M	U	V	I	U	A	B	E
F	G	R	O	W	T	H	W	I	D	D	S
H	S	Y	U	P	K	T	S	K	S	V	D
H	U	L	D	E	P	O	S	I	T	O	B
W	D	N	U	O	P	M	O	C	S	M	E

- [ ] INTEREST
- [ ] COMPOUND
- [ ] SIMPLE
- [ ] PRINCIPAL
- [ ] SAVINGS
- [ ] BALANCE
- [ ] PERCENT
- [ ] BORROW
- [ ] DEPOSIT
- [ ] GROWTH

7 Which account would you choose?

3 points

You have £100. **Account A**: 4% a year, locked for 3 years. **Account B**: 2%, no lock-in.

Which account would you choose, and why?

> No single right answer. A earns more (about £112.49 after 3 years of compound interest, against about £106.12 in B), but the money is locked away. B is better if you might need the money sooner. Look for a reason that weighs the extra interest against being able to get at the money.

8 Before you go

One thing I learned today

One question I still have

How sure do I feel?

Not yet | Getting there | Got it

Take it home

Ask an adult at home: does any account you know of pay interest? What is the rate? Work out the interest on **£100** for one year.

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