Simple Interest, the Line in Money

Students learn the vocabulary of interest, use I = Prt and A = P + Prt, recognize simple interest as a line (constant difference, y-intercept P, slope Pr), and solve the formula for r, t, or P with the Unit 1 moves.

TIME	40 minutes (one student with a parent or tutor, or a small group)
WHO	Math 1 (algebra readiness), about age 12. Follows Unit 7. Opens Unit 8.
MATERIALS	Student worksheet (PDF), the Deep Dive 5 interactive page for this lesson, pencil, calculator
PRIOR KNOWLEDGE	Percent as a decimal (middle school). Slope and y-intercept (Unit 3). Solving one-step equations by dividing both sides (Unit 1, Lesson 4). Lines add, exponentials multiply (Unit 7).
STANDARDS	NC.M1.A-SSE.1a, NC.M1.F-LE.5, NC.M1.A-CED.4, NC.M1.F-IF.2.
KEEP OUT	Compound interest (Lesson 2). Compounding periods (Lesson 3).

Learning goals

1. Define principal, interest, rate, and balance, and write a percent as a decimal.
2. Compute I = Prt and A = P + Prt, to the cent.
3. Explain why simple interest is a line: constant difference, y-intercept P, slope Pr.
4. Solve I = Prt for r, t, or P by dividing both sides, and use the result.

Vocabulary: say both, every time

The rule for the whole lesson: whenever the adult or the student says a math word, they follow it with the plain-English version. Proper term first, plain English second, until the student does it without being asked.

TERM	LOOKS LIKE	PLAIN ENGLISH
Principal	P	The money you start with.
Interest	I	The extra money.
Rate	r, as a decimal	5% is 0.05.
Simple interest	on the principal only	Same dollars each year.
Balance	A	P + Prt.

> THE ONE SENTENCE TO SAY OUT LOUD
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> Simple interest adds the same dollars every year. Lines add. P is where it starts, Pr is what is added each year.

Lesson timeline (40 minutes)

0:00 to 0:05	Warm-up: percent to decimal. 5%, 12%, 3.5%, 0.8%. Catch 0.5 for 5%.
0:05 to 0:16	Mini-lesson: the words and the table. Principal, interest, rate, balance. $1,000 at 5%: build the table with the interactive builder. Ask: what family? Constant difference of $50, a line. Name P as the y-intercept and Pr as the slope. Plot the $200 example.
0:16 to 0:26	Solve the formula. I = Prt for r: divide both sides by Pt, write it stacked. Then t and P. Work the $600, $54, 3 years question and check it forward.
0:26 to 0:36	Practice. The practice problems or Worksheet Parts C to E. Same buttons: Hint, Show next step, Reveal answer, Hide help. Students mark how they did and can print My results.
0:36 to 0:40	Exit ticket. Worksheet Part F. Success looks like I = $120.00 and A = $620.00; 300 as the principal and 15 as the dollars added each year.

Misconceptions to listen for

- **5% is 0.5.** Divide by 100: 0.05.
- **I is the balance.** I is only the interest; A = P + I.
- **Divide by P only.** r is multiplied by both P and t: divide by Pt.
- **Time in months.** The rate is yearly; t is in years.
- **Interest grows each year.** Not with simple interest: the same every year. That changes in Lesson 2.

Support and stretch

Support

Keep a percent-decimal strip on the desk. Use the table builder for several years. Write the formula with boxes for each letter before substituting.

Stretch

Ask how long it takes the $1,000 at 5% to double with simple interest (20 years), and hold that number for Lesson 5. Ask for the equation of the line for $750 at 4%.

Where this goes next

Lesson 2: compound interest. Interest earns interest, the balance multiplies by 1 + r each year, and the line becomes an exponential.

> THE HABIT TO BUILD
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> Rate as a decimal, I = Prt, then add the principal. To find another letter, divide both sides.