

Lesson 10-4 • Group 1

Reinforce Understanding

10.4 Small Group • Group 1

With my small group, I can use ratios and models to explain how the Penny Farthing and gear-driven bicycles were ingenious solutions to a real problem — one step at a time, with support.

Worked model

A later bicycle design uses a chain: the pedal gear has 48 teeth, and the largest rear gear has 32 teeth.

1. For each rotation of the 48-tooth pedal gear, the wheel gear also turns 48 teeth.
2. The 32-tooth gear needs to turn 32 teeth to make one full rotation, so I find the equivalent ratio: $48 \div 32 = 1.5$.
3. The rear wheel makes 1.5 rotations for each pedal rotation — this gear makes it easier to pedal at slower speeds or go uphill.

Practice

Complete each exercise. Show the reasoning that supports your answer.

1. Sort each rear gear by how the wheel responds to one pedal turn.

Write the name of the correct group on each line.

Groups: More than one wheel rotation One rotation or less

- _____ 12-tooth rear gear
- _____ 16-tooth rear gear
- _____ 24-tooth rear gear
- _____ 48-tooth rear gear
- _____ 60-tooth rear gear
- _____ 96-tooth rear gear

2. The pedal gear has 48 teeth. Complete the table of wheel rotations per pedal turn.

Complete the table. Show how you found each value.

Rear gear (teeth)	Ratio $48 \div \text{teeth}$	Wheel rotations per pedal turn
12		
16		
24		

Show your work
