NumberWonders Prime Activity Kit v1

Pilot release - direct download edition

This printable kit helps grades 5-9 learners master prime/composite logic, divisibility tests, factor trees, and reasoning through puzzle-style activities.

Estimated Time: 10 sessions x 30-45 min

Format: Printable worksheet + challenge board pack

Audience: Middle school classrooms, clubs, homeschool

License: One classroom or one household

(Primes) (Divisibility) (Factorization) (Reasoning) (Answer key included)

Teacher Quick Start

1. Warm up with worksheet mini-drills (10 minutes).
2. Run one core worksheet in pairs or small groups (20-25 minutes).
3. Discuss one strategy per team and compare methods (8-10 minutes).
4. Use challenge board tasks as extension or homework.

> **Classroom tip:** Use a visible "prime wall" where teams post numbers they proved prime and the method used.

Worksheet Index

#	Topic	Target Skill
1	Prime or Composite Quick Check	Classification and reasoning
2	Divisibility Tests Lab	Rules for 2,3,5,9,10,11
3	Sieve Sprint	Prime detection by elimination
4	Factor Tree Workshop	Prime factorization
5	Greatest Common Factor	GCF with factorizations
6	Least Common Multiple	LCM with prime powers
7	Prime Gap Explorer	Pattern spotting
8	Mersenne and Twin Primes	Special prime families
9	Cryptic Factor Puzzles	Reverse reasoning
10	Prime Detective Challenge Board	Mixed application

Worksheet 1: Prime or Composite Quick Check

Mark each number as Prime (P) or Composite (C), then justify 3 choices.

1) 2 ____

2) 9 ____

3) 17 ____

4) 21 ____

5) 29 ____

6) 31 ____

7) 33 ____

8) 37 ____

9) 49 ____

10) 51 ____

Worksheet 2: Divisibility Tests Lab

For each number, list all tests that prove divisibility (2,3,5,9,10,11).

1) 120: _____

2) 231: _____

3) 495: _____

4) 693: _____

5) 1,210: _____

6) 1,001: _____

7) 2,970: _____

8) 4,356: _____

Worksheet 3: Sieve Sprint

Use a sieve to mark all primes from 2 to 100. Then answer:

1) How many primes are between 1 and 100? _____

2) List the primes between 50 and 80: _____

3) Which composite numbers survived until the last elimination step? _____

4) Why can you stop checking divisors after sqrt(n)? _____

Worksheet 4: Factor Tree Workshop

Find prime factorization and write in exponent form.

1) 84 = _____

2) 126 = _____

3) 180 = _____

4) 252 = _____

5) 432 = _____

6) 693 = _____

7) 945 = _____

8) 1,008 = _____

Worksheet 5: Greatest Common Factor

Compute GCF using prime factorization.

1) GCF(18, 24) = _____

2) GCF(45, 75) = _____

3) GCF(84, 126) = _____

4) GCF(96, 144) = _____

5) GCF(210, 315) = _____

6) GCF(256, 640) = _____

Worksheet 6: Least Common Multiple

Compute LCM using prime powers.

1) LCM(6, 8) = _____

2) LCM(12, 18) = _____

3) LCM(15, 20) = _____

4) LCM(21, 28) = _____

5) LCM(24, 36) = _____

6) LCM(45, 60) = _____

Worksheet 7: Prime Gap Explorer

Find prime gaps and describe patterns.

1) Gap between 11 and 13 = _____

2) Gap between 23 and 29 = _____

3) Gap between 47 and 53 = _____

4) Gap between 89 and 97 = _____

5) In the range 2..100, what is the largest prime gap? _____

6) Can prime gaps be odd? Explain. _____

Worksheet 8: Mersenne and Twin Primes

Classify each statement as True/False.

1) If 2^p - 1 is prime, then p is prime. _____

2) (11, 13) is a twin prime pair. _____

3) (23, 25) is a twin prime pair. _____

4) 31 is a Mersenne prime. _____

5) 63 is a Mersenne number. _____

6) Every Mersenne number is prime. _____

Worksheet 9: Cryptic Factor Puzzles

Use clues to find the hidden number.

1. I am composite, less than 50, and my prime factors are 2, 3, and 5. Who am I?
2. I am divisible by 9 and 11, between 80 and 120. Who am I?
3. I have exactly three prime factors: 2^2, 3, and 7. Who am I?
4. I am the smallest odd composite with two distinct prime factors. Who am I?

Worksheet 10: Prime Detective Challenge Board

Solve any 8 tasks. Circle your strategy for each: test, tree, or logic.

1) Is 221 prime? _____

2) Prime factors of 378 = _____

3) GCF(168, 252) = _____

4) LCM(42, 70) = _____

5) Next prime after 997 = _____

6) Is 2,047 prime? _____

7) Is 1,001 prime? _____

8) Write one twin prime pair above 100.

9) Write one Mersenne number that is composite.

10) Create your own prime puzzle for a partner.

Answer Key

Worksheet 1

1 P, 2 C, 3 P, 4 C, 5 P, 6 P, 7 C, 8 P, 9 C, 10 C

Worksheet 2

1) 2,3,5,10 2) 3 3) 3,5,9 4) 3,9,11 5) 2,5,10,11 6) 7,11 (11 by alternating sum test) 7) 2,3,5,9,10,11 8) 2,3,11

Worksheet 3

1) 25 primes 2) 53,59,61,67,71,73,79 3) open response based on process 4) because any larger factor pairs with one below sqrt(n)

Worksheet 4

1) 2^2 x 3 x 7 2) 2 x 3^2 x 7 3) 2^2 x 3^2 x 5 4) 2^2 x 3^2 x 7 5) 2^4 x 3^3 6) 3^2 x 7 x 11 7) 3^3 x 5 x 7 8) 2^4 x 3^2 x 7

Worksheet 5

1) 6 2) 15 3) 42 4) 48 5) 105 6) 128

Worksheet 6

1) 24 2) 36 3) 60 4) 84 5) 72 6) 180

Worksheet 7

1) 2 2) 6 3) 6 4) 8 5) 8 (in 2..100) 6) gaps between odd primes are even (except involving 2)

Worksheet 8

1 True 2 True 3 False 4 True 5 True 6 False

Worksheet 9

1) 30 2) 99 3) 84 4) 15

Worksheet 10

1) 221 = 13 x 17 (composite) 2) 2 x 3^3 x 7 3) 84 4) 210 5) 1009 6) 2,047 = 23 x 89 (composite) 7) 1,001 = 7 x 11 x 13 8) example: 101 and 103 9) example: 2^{11} - 1 = 2047 10) open response