

PLAYER AND EDUCATOR MANUAL | VERSION 1.0

Minus Moonbase

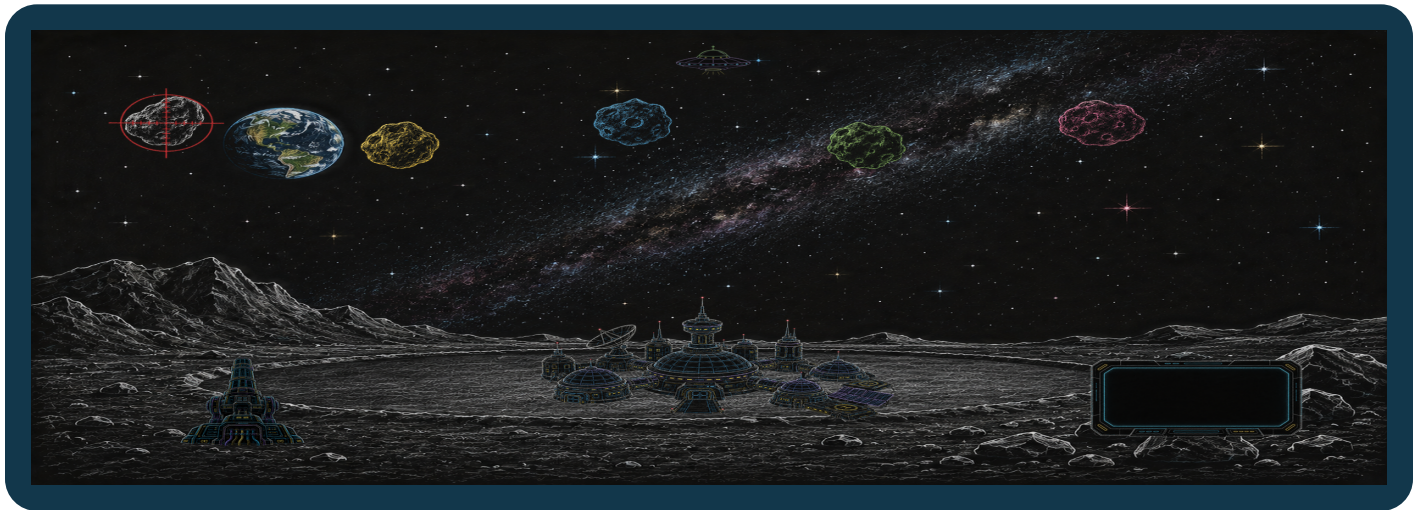
Subtraction practice with a mission...



Read the lunar monitor, enter the difference, and fire the plasma cannon before five incoming asteroids reach the base.

This guide helps players begin quickly and gives families and educators practical ways to connect the game with place value, strategy, negative numbers, printable practice, and meaningful off-screen mathematics.

Quick Start



Ready, aim, subtract!

Minus Moonbase is a focused subtraction-practice game. Solve the vertical equation on the green monitor, type the difference, and fire at the targeted asteroid before it reaches the lunar outpost.

Four steps to launch

1**SOLVE**

Read the problem on the monitor.

2**ENTER**

Type the complete answer.

3**FIRE**

Press Enter or Space.

4**CONTINUE**

Protect all three bases.

Essential controls

0-9

ENTER

SPACE

BACKSPACE

DELETE

ESC

Mission Control

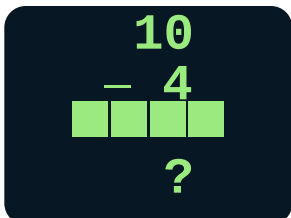
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Know your lunar workspace

- 1 **Status line**
Bases remaining, correct answers, and current range.
- 2 **Asteroid lanes**
Five threats descend independently.
- 3 **Target reticle**
Shows which asteroid the next shot will engage.
- 4 **Plasma cannon**
Slides beneath the target while play continues.
- 5 **Lunar base**
One of three bases available per mission.
- 6 **Green monitor**
Shows the vertical problem and typed answer.

Read the monitor like paper arithmetic



The ones digits share a column. The horizontal rule separates the problem from the answer field, and the question mark becomes the player's typed answer.

How to Play

One problem. One target. One decision.

The equation stays on screen after a miss, giving the learner time to reconsider. A correct shot advances the score, replaces the problem, and schedules a new asteroid in that lane.

READ**CHOOSE A STRATEGY****TYPE****FIRE**

Correct shot

The beam strikes the target. The asteroid disappears, CORRECT increases by one, a new equation appears, and the lane refills after about 1–3 seconds.

Near miss

The beam passes randomly left or right. The asteroid and equation remain. The typed answer clears automatically so the learner can try again immediately.

Target order and timing

After a shot finishes, targeting advances through active lanes from left to right. The cannon's usual move takes about half a second; crossing from the far-right lane to the far-left takes about 1.25 seconds. Asteroids and all other animation keep moving while the cannon travels.

A useful rhythm for young mathematicians

Pause long enough to solve, enter the entire answer, then fire. Counting backward, counting up, drawing, fingers, counters, or a number line are all legitimate supports.



Controls and Answer Entry

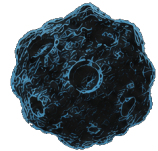
Minus Moonbase uses a small, consistent keyboard vocabulary. Main-keyboard digits and the numeric keypad both work.

0-9**Enter digits**

Replaces the ? with the typed answer.

ENTER**Fire**

Fires only when an answer is present.

**SPACE****Fire / continue**

Also deploys another base or starts a fresh mission.

BACKSPACE**Clear**

Erases the full answer and restores the ?.

**DELETE****Clear**

Same behavior as Backspace.

ESC**Quit**

Closes the application at any time.

When a key does nothing

Enter and Space do not fire before digits are entered. Holding a firing key does not create repeated shots, and another shot cannot begin while the previous plasma beam is traveling.

Progress, Bases, and Results

Challenge grows with successful practice

Each mission begins with three bases, a maximum problem number of 10, and asteroids that take about 30 seconds to descend from top to bottom.

0–10

START

0–20

10 CORRECT

...

THROUGH 100

10% FASTER

EACH NEXT 10

Every 10 correct answers

- A flying saucer crosses the top in about five seconds.
- The maximum equation number rises by 10 until it reaches 100.
- After 100, descent speeds up 10% per additional group of ten.

Bases and game over

If an asteroid touches the base, cannon, or monitor, all three installations explode and vanish. After the first two losses, press Space to deploy another base. The third loss ends the mission and opens the summary.

Finish with encouragement

The summary reports total correct answers and one randomly selected positive affirmation. Press Space to begin a fresh mission. The total describes one play session; it is not a grade or a measure of intelligence, effort, worth, or mathematical potential.

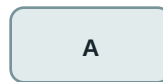
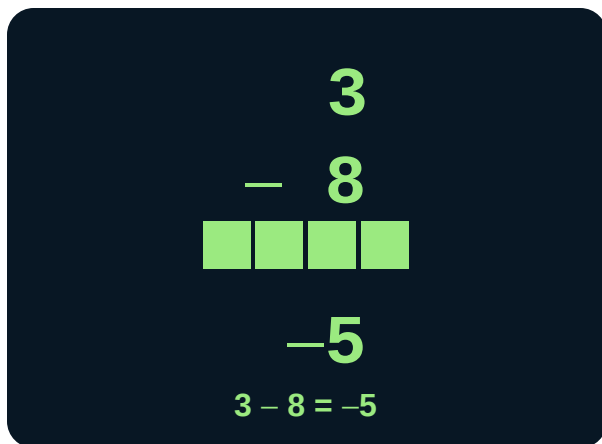


Advanced Mode

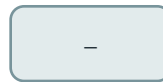
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Advanced Mode: subtract across zero

For learners ready for negative differences, press A while the opening splash screen is visible. The option is intentionally unadvertised in the application so an adult or educator can introduce it at an appropriate time.



Choose Advanced Mode only during the splash screen.



Toggle negative / positive. Main keyboard or numeric keypad.

How sign entry works

Either equation number may be larger. Press the minus key at any time to toggle the answer's sign. The sign appears conventionally to the left of the entered digits. Before digits are typed, the monitor shows $-?$. Press minus again to return to positive.

Make the idea concrete

Use a number line: start at 3 and move 8 places left to reach -5 . Connect negative values to temperatures below zero, floors below ground, elevation, or debts and credits. Emphasize that the sign tells direction or position relative to zero.

Advanced Mode persists through replacement bases and new missions until the application closes. Launch normally next time to return to standard, nonnegative subtraction.



Worksheet Generator

Printable practice—without the asteroid clock

Press W during the splash screen to open the secret worksheet generator instead of normal gameplay. Background music is disabled in this mode.

Quantity

Choose 10, 15, 20, 25, or 30 problems. Default: 10.

Answer key

Bottom of worksheet (default), or a clean separate page with solutions filled in.

Generate

Choose a name and location in the standard Windows Save dialog. The app closes after a successful save.

How worksheets are built

Each US Letter portrait page includes NAME and DATE lines, numbered vertical equations, generous answer space, and four randomly selected game sprites in each one-inch side margin. The lunar base, plasma beam, and monitor are excluded from decorations. Separate answer-key pages omit all game artwork so solutions remain easy to scan.

Built-in differentiation

Problems become gradually harder: the first ten use numbers through 10, the next ten through 20, and the final ten through 30. Worksheet answers remain nonnegative, matching the game’s standard starting level.

NAME: _____

DATE: _____

1. 10
 - 3

2. 11
 - 4

3. 11
 - 3

4. 12
 - 4

5. 12
 - 3

6. 13
 - 4

WORKSHEET PREVIEW

ANSWER KEY

1. 10
 - 3

 7

2. 11
 - 4

 7

3. 11
 - 3

 8

4. 12
 - 4

 8

5. 12
 - 3

 9

6. 13
 - 4

 9

SEPARATE ANSWER KEY PREVIEW

What the Game Practices

Practice with purpose

Minus Moonbase turns repeated symbolic subtraction into a clear defend-the-base objective. Its purpose is focused practice—not prolonged engagement, diagnosis, or a judgment about mathematical worth.

Meaning

Interpret – as taking away or finding a difference; notice subtracting zero and making zero.

Place value

Align ones, tens, and hundreds in vertical notation; enter one-, two-, and three-digit answers.

Strategy

Count back, count up, make ten, decompose, use known facts, and check subtraction with addition.

Across zero

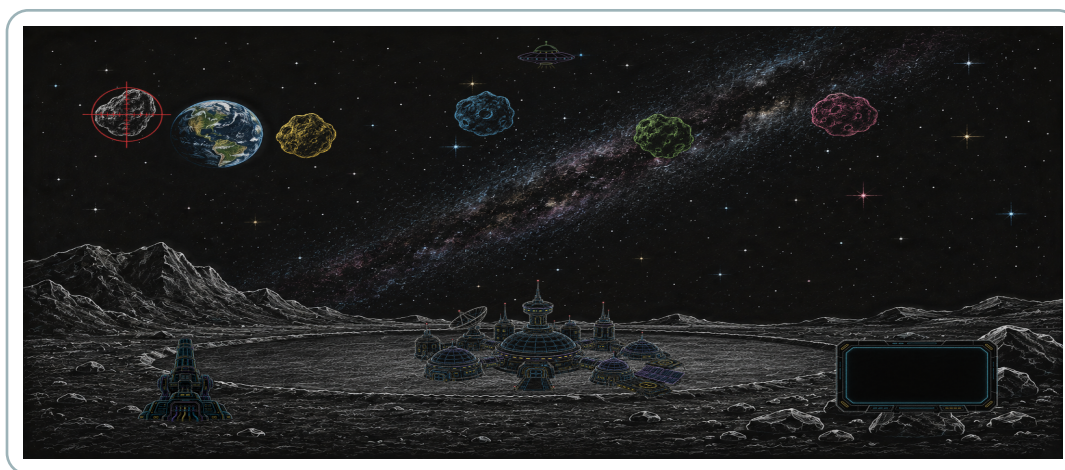
In Advanced Mode, distinguish magnitude from sign and locate negative values on a number line.

Fluency supported by understanding

Comfort with subtraction facts can free attention for later work, but quick answers are not the whole of subtraction. Pair the game with objects, drawings, story problems, number lines, and conversation. The vertical display reinforces place-value alignment; it does not by itself teach regrouping.

Immediate, neutral feedback

A correct response removes an asteroid. A wrong response creates a harmless near miss, clears the answer, and leaves the problem available. The intended message is: reconsider and try again.



Play, Talk, and Extend

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Make the thinking visible

A caring adult, sibling, classmate, or peer can turn a short mission into a richer mathematical conversation. Ask with curiosity, allow wait time, and follow the learner's strategy.

- ? How did you figure that one out?
- ? Could you count backward—or count up—to check it?
- ? What related addition fact could help?
- ? Why is a number minus itself equal to zero?
- ? Which digit is in the ones place?
- ? Will the answer be above zero, zero, or below zero?
- ? Can you show it with blocks, a drawing, or a number line?

After the screen

- Recreate one remembered equation.
- Write it horizontally and vertically.
- Invent a short story problem.
- Check the difference with addition.
- Build it with objects or a number line.

Notice strategies, not speed

A learner may count every object, count on from the smaller number, use fingers, recall a known fact, or reason from another equation. Each strategy offers useful information about current understanding.



Responsive and Inclusive Use

Every learner is different

Children vary in prior experience, language, motor access, keyboard familiarity, vision, hearing, attention, and comfort with timed movement. Responsive use adapts the activity to the learner and context.

1**Offer another path**

If animation, sound, keyboard entry, or time pressure interferes with reasoning, use untimed cards, counters, drawings, or a number line.

2**Play collaboratively**

One person can calculate while another types and fires. Swap roles or reproduce a problem on paper.

3**Treat speed as a mechanic**

Descending asteroids and changing pace are game rules—not measures of intelligence.

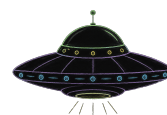
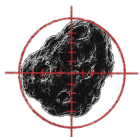
4**Keep technology bounded**

One thoughtful mission can be enough. Balance screen practice with movement, books, play, and conversation.

5**Do not diagnose from a score**

The game is not a standardized or diagnostic assessment and cannot replace an educator's judgment.

A successful session does not need to be a long session.



Technical Notes and Credits

A compact Windows 11 learning game

Minus Moonbase is independently developed as a native 64-bit Windows application. It resizes with its window while preserving a 16:9 playfield; non-16:9 maximized displays use black letterboxing.

Display

Resizable or maximized window; elapsed-time movement, layered artwork, and procedural explosions.

Audio

Quiet ambient MIDI plus a plasma-cannon effect. Worksheet mode starts without music.

PDF worksheets

Compressed 300-DPI US Letter PDFs generated natively; no Office, PDF printer, .NET, iTextSharp, or separate PDF library required.

Embedded runtime assets

The background, sprite atlas, music, effect, and icon are compiled into the executable. Missing embedded data is reported before exit.

Distribution

The signed x64 executable and signed MSIX package identify Minus Moonbase version 1.0.

At-a-glance hidden options

A

Advanced Mode: allows negative differences.

W

Worksheet Generator: creates printable PDF practice.

Minus Moonbase version 1.0

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Use this manual with the learner—not as a script. Observe, listen, invite explanation, and choose the next representation or challenge based on what the child is showing you.