# Bunny Times

It's carrot season on the farm, and Coach Hopper needs new recruits for the bunny team!

Bunny Times presents a visual and interactive approach for children to learn, with understanding, the multiplication facts $2 \times 2$ through $12 \times 12$. The early levels of the game introduce children to an array model of multiplication. A statement like $3 \times 4$ is represented as a field with four rows of three carrots each. Children control the hops of a bunny, telling it how many carrots are available to eat. Correct answers are rewarded with the bunny hopping through the field, collecting each carrot, and performing a celebratory somersault.

At these early levels, the numbers are small enough that children can, if necessary, count carrots one by one. Soon complicating matters is a fog patch that obscures the view of many carrots. Since counting carrots is now harder, children begin to focus on the number of rows and columns in each field and may adopt a skip-counting strategy to determine the total number of carrots.

As the fields of carrots grow larger, children graduate from a single bunny to controlling entire teams of bunnies that hop in unison. Soon, children discover that the bunny teams can be divided into smaller teams of brown and gray bunnies. By doing so, children take a problem they don't know, like $8 \times 7$, and break it into two simpler problems they do know, like $5 \times 7$ and $3 \times 7$. Computing the two products, 35 and 21, and adding them together gives the result, $8 \times 7 = 56$.

Bunny Times rewards repeated play with opportunities for children to improve their scores and develop, at their own pace, new insights and strategies into multiplication. By progressing successfully through all 11 levels of the game, children will approach multiplication with confidence, accuracy, and understanding.

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## Game Mechanics

Press *Learn to Play* on the title page of the game for a brief video geared towards children that explains the basic functionality of the game. Below are a few remaining gameplay tidbits not covered in the video.

- If children mistakenly press an incorrect number on the number pad, they can press the left arrow to delete digits one by one or press 'C' to clear the number entirely.

- Children can press *Next Problem* rather than *Eat Carrots* after entering the total number of carrots in a field. Doing so presents a speedy animation of the bunnies hopping.

- If children play a level more than once, they can see their previous high score for that level in the upper-left corner beneath the level number.

- Children can return to any level that they do not finish and resume play.

- To reset all scores and high scores to 0 and start fresh, press *Reset All Levels* on the Levels page. The button, once confirmed, will initialize all the level pages and will remove any Coats of Arms on the medals.

## Game Levels

Below are descriptions of the 11 levels of Bunny Times.

Level 1

A single bunny eats carrots in fields whose dimensions increment in an orderly fashion from 2 × 2 to 6 × 5. The problems begin with the × 2 facts (2 × 2, 3 × 2, 4 × 2, 5 × 2, 6 × 2), proceed to the × 3 facts, and eventually conclude with the × 5 facts. Some children may simply count the carrots one by one to determine the total number of carrots. Others may use the ordering of the problems to their advantage, employing an "adding on" strategy. For example, since 3 × 5 is 15, then 4 × 5, the next problem in the sequence, is 5 more, or 20.

Level 2

A single bunny eats carrots in fields whose dimensions again range from 2 × 2 to 6 × 5, but now the problems are presented in random order. The randomness of the problems may encourage a skip-counting strategy. For example, to determine 6 × 5, children skip count 5, 10, 15, 20, 25, 30.

Level 3

A single bunny eats carrots in fields whose dimensions again range from 2 × 2 to 6 × 5, but now a patch of fog partially obscures many of the carrots. Since counting carrots one by one is now much harder, children will likely use a different strategy, such as skip counting. The bottom row and rightmost column of carrots are always visible, allowing children to see the dimensions of the field.

Level 4

Levels 1 through 3 serve as an introduction to multiplication, but are limited to a single bunny hopping through the field. Level 4 introduces teams of bunnies that hop and eat carrots in unison. Bunny teams allow children to develop new strategies for deepening their understanding of multiplication.

In level 4, bunny teams that alternate between 2 and 3 bunnies help children make connections between the × 2 facts and the × 3 facts. Here is an example: A team of 2 brown bunnies jumps in unison to eat 7 rows of carrots (7 × 2). As the two bunnies hop down the field, children can skip count 2, 4, 6, 8, 10, 12, 14.

For the next problem, the team of two brown bunnies is joined by a gray bunny to eat a field with three carrots in each of the 7 rows (7 × 3). Displaying $7 \times 3$ as $(7 \times 2) + (7 \times 1)$ visually suggests that if you know $7 \times 2$ is 14, you can find $7 \times 3$ by adding 7 more to 14 to obtain 21.

Level 5

Alternating teams of 10 and 5 bunnies help children make the connection between the × 10 facts and the × 5 facts. Knowing, for example, that $4 \times 10$ is 40, children can reason that $4 \times 5$ is half of 40, or 20.

A moveable slider separates the brown bunny team from the gray bunnies. The slider's initial placement helps emphasizes the connection between the × 10 facts and the × 5 facts, but children can drag the slider to redistribute the bunnies between the teams in other ways that they may find helpful.

Level 6

In level 6, teams alternate between 4 bunnies and either 3 or 5 bunnies. This helps children make connections between the × 4 facts and the × 3 and × 5 facts.

For the × 4 facts, the slider separates the bunnies into teams of 2 brown bunnies and 2 gray bunnies. This encourages children to use a doubling strategy, connecting the × 4 facts with the × 2 facts (For example, to find $4 \times 9$, start with $2 \times 9 = 18$ and then double the result to get 36.)

For the × 3 facts, the slider shows teams of 2 bunnies and 1 remaining bunny to encourage children to connect the × 3 facts with the × 2 facts. For the × 5 facts, the slider shows all bunnies on the same team, and children can skip count by fives. Alternatively, children can drag the slider to split the 5 bunnies into two teams.

Level 7

Six bunnies are split into teams of 5 bunnies and 1 remaining bunny so that children can use their knowledge of × 5 facts to learn the × 6 facts. For example, since $8 \times 5 = 40$, then $8 \times 6$ is 8 more, or 48. Similarly, 7 bunnies are split into teams of 5 bunnies and 2 bunnies so that children can use their knowledge of × 5 facts to learn the × 7 facts. The × 6 facts alternate with the × 7 facts, allowing for one additional layer of connection: Since $9 \times 6 = 54$, for example, then $9 \times 7$ is 9 more, or 63.

As with earlier levels, children can move the slider to redistribute the bunnies between the teams in other ways that they may find helpful.

Level 8

Eleven bunnies are split into teams of 10 bunnies and 1 remaining bunny so that children can use their knowledge of × 10 facts to learn the × 11 facts. For example, since $10 \times 6 = 60$, then $11 \times 6$ is 6 more, or 66. Similarly, 12 bunnies are split into teams of 10 bunnies and 2 bunnies so that children can use their knowledge of × 10 facts to learn the × 12 facts. The × 11 facts alternate with the × 12 facts, allowing for one additional layer of connection: Since $7 \times 11 = 77$, for example, then $7 \times 12$ is 7 more, or 84.

As with earlier levels, children can move the slider to redistribute the bunnies between the teams in other ways that they may find helpful.

Level 9

This level alternates between bunny teams of size 8 and 9. Unlike earlier levels, the slider is always placed entirely to the side, allowing children to decide for themselves how, or if, they will divide the bunnies into teams.

Level 10

This Half Marathon level presents 50 random problems ranging from $2 \times 2$ to $10 \times 12$. In each one, the slider is initially positioned in way that may help children to break the multiplication problem down into two simpler problems.

Level 11

This Marathon level presents 100 random problems ranging from $2 \times 2$ to $10 \times 12$. In each one, the slider is initially positioned in way that may help children to break the multiplication problem down into two simpler problems. Unlike the earlier bunny team levels, a patch of fog obscures many of the carrots, prompting children to think about each problem more abstractly.


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