Monster School Bus
Teacher Guide

Monster School Bus is available at mathsnacks.org

Monster School Bus is a game that allows students to visualize grouping, specifically in groups of ten, with whole numbers and decimals. *Monster School Bus* helps give students visual representations of grouping.

Time Required: Two gaming sessions: 40 minutes each. Bonus activity: 30 minutes

Learning Objectives:
By playing *Monster School Bus* and engaging in at least one of the recommended bonus activities, students will:
- Find groups of numbers that equal 10 or 1.
- Recognize there are multiple representations for grouping numbers.

Vocabulary: Number, decimal, whole, group

Vocabulary in Spanish: Número, decimal, entero (whole number – número entero), grupo

Materials and Technology required:
- Access to computers and the Internet

Common Core State Standards Covered

Standard	Standard Description
4.NF	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
4.NF.7	Add, subtract, multiply and divide decimals to hundredths, using concrete models or drawings or strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
5.NBT	Perform operations with multi-digit whole numbers and with decimals to hundredths.

Preliminary Preparation

1. Please play the game so that you understand the game mechanics and how the math concepts are taught during gameplay. Note how the levels change throughout the game, from simple 10-frames to more complex groups, and finally into decimals and then more complex decimals. The games are intended to be a fun way for students to learn, and you will learn along with them.
2. Secure the proper number of computers for each student to play the game.
3. Make sure *Monster School Bus* is open on all computers before taking the class to the computer lab. This will maximize game playing time in the lab.

Game Session 1 (40 minutes)

Note: There is no need to *teach* grouping before going to the computer lab. We suggest giving students the experience of playing the game first. It is also important to encourage students to talk and discuss while they are playing the game. Keep the sound at a manageable level, but we suggest not having students mute the sound.

1. Allow students to play the game for 15–20 minutes.
2. Have students pause the game, and lead a discussion with the students about the gameplay.
   (Limit discussion to 10 minutes.)
   - What do you like about this game?
   - What are you trying to do in each level?
   - What does it mean to have a full load?
   - What are some strategies you are using to get each full load?
   - Are there any things you should try not to do when you are looking for a full load?
   - What strategies are you using to get 3 stars on a level?
3. Allow students to continue to play the game for 15–20 more minutes.
4. Students will not necessarily finish all levels of a game in one class period. This game is designed to accommodate various levels and could be played multiple times for increased understanding and practice.
5. Encourage students to play *Monster School Bus* at home.

Monster School Bus can be found at www.mathsnacks.org
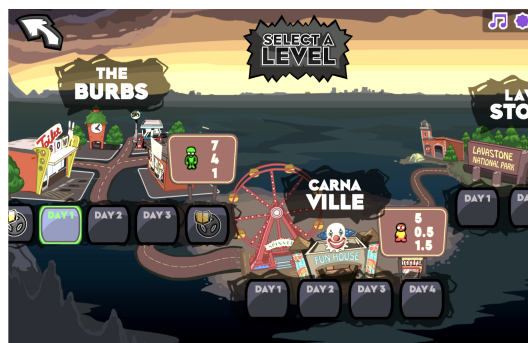
Ask students to play the levels in order. However, all levels are open and accessible in any order. Students playing at home or on different computers can pick up where they left off.

Bonus Activity and Discussion Questions (30 minutes)

This activity is written for a class of 24 students. Please make adjustments as needed for fewer or more students.

Supplies:

24 index card for each set of numbers listed below.

Add or eliminate number pairs to match your class size.

SET 1: Number pairs that equal 10		SET 2: Number pairs that equal 1		SET 3: Number pairs That equal 100	
1	9	.25	.75	10	90
2	8	.15	.85	20	80
3	7	.05	.95	30	70
4	6	.35	.65	40	60
5	5	.45	.55	50	50
3.5	6.5	.40	.60	25	75
2.5	7.5	.30	.70	35	65
1.5	8.5	.20	.80	45	55
.5	9.5	.10	.90	15	85
4.5	5.5	0.0	1.0	5	95
0.5	9.5	.5	.50	33	67
3.3	6.7	.33	.67	46	54

1. Write each number in SET 1 on a separate piece of paper or an index card.
2. Give one card to each student. (If there is an odd number of students, play along!)
3. Tell students to find the person in class who has the number that when added to their number equals 10 without talking.
4. Collect the cards and pass them out again. Have students find their "partner" again. Repeat 2–3 times and give students different numbers each time.

Discussion questions after Number Set 1:
 • What are some strategies you can use to find your partner? (Hopefully, "counting up" or subtraction will be mentioned in discussion.)
 • Do you think you can do this if we try to find two numbers that equal 1?

5. Repeat steps 1–5 with the second set of numbers – the decimals that equal 1.

Discussion questions after Number Set 2:
 • How is adding two numbers to get 1 similar to adding two numbers to get 10?
 • Do you think you can do this if we try to find two numbers to get a total of 100?

6. Repeat steps 1–5 with the third set of numbers – the whole numbers and decimals that add to 100.

Discussion questions after Number Set 3:
 • What strategies did you use to find the numbers you need to equal 100?
 • How are these strategies related to finding pairs of numbers that equal 10? What about pairs of numbers that equal 1?
 • What are some ways this activity can help you next time you play *Monster School Bus*?

Gaming Session 2 (40 minutes)

1. Ask students to play the levels in order. However, all levels are open and accessible in any order. Students playing at home or on different computers can pick up where they left off.
2. Ask students to think about the bonus activity as they play the game again and encourage them to try to get 3 stars on every level. Remind them that there is no time limit on the levels and that they might want to consider pre-planning which numbers add up to 10.
3. Allow students to play for 15 minutes. Ask students to pause the game.
   Ask the following questions: (Limit discussion to 10 minutes.)
   • How do the later levels in *Monster School Bus* get more challenging?
   • What are some strategies you have used to get 3 stars?
   • If you were designing harder levels, what would you recommend?
4. Have students continue to play for as long as time allows.

The Bow
(Tie it all together to bring out the main ideas)

1. Can you give me some examples of number pairs that add up to 10, including decimals?
2. Can you give me some examples of number pairs that add up to 1?
3. Can you give me some examples of number pairs that add up to 100?
4. How are all of these related?
5. If I give you one of the numbers, what are some of the strategies you use to find the second number to get a "Full Load"?
6. Do some examples that show different strategies for finding number pairs that add to 10, 1, 100 or even 1000.
7. Can you give me three numbers that add up to 10? That add up to 1? That add up to 100?
8. What are some strategies for finding a set of three numbers that add up to 10, 1 or 100?

Encourage students to keep playing *Monster School Bus* at home. Encourage them to try to get through all levels of the game.

http://www.mathsnacks.org