Cartesian Candy Bars II

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Summary	Children work on sharing different amounts of candy bars among different numbers of people. They compare ratios (candy bars per person) and plot points in a Cartesian grid.
Goals	1. Increase students' understanding of ratios and fractions in graphical, notational, and story contexts.
Materials	Overheads and Handouts.
Keywords	Contextualized Situations Coordinate Pairs Fractions Full Class Discussion Function Representations Interpretation of Graphs Linear Functions Production of Graphs Ratios Small Group Work
Notes	Students also work on problems in this context in Lesson 4.09 – Cartesian Candy Bars I. It is not necessary that they have completed that lesson, but the instructor may wish to review it for background information. Have the children work in groups of four (or fewer). This will be important for small group discussions.

Activity Plan:

1. Sharing candies (Group Work)

   Distribute handout on Page 1.

   Have children work in groups of four (or fewer).

   Ask children to show how they would share the candy bars equally among those at each table, A, B, C, and D.

   > *Which table would you sit at? Why? Convince us that you chose the best table. Are any tables the same?*

   Show the solutions of a few children to the class and discuss them at length.

2. Representing the tables in the grid

   Distribute the second handout (Page 2) and ask the children to find out the points where the tables fall.

   Ask students to imagine that the graph space represents the classroom space and that there are tables at each intersection of grid lines. On each table there are ***y*** candy bars and ***x*** chairs are placed around the table. There will be one child at each chair. The children at each table will share the candy bars equally between themselves.

   Clarify how the tables are ordered in terms of share-size per person. Help the children adopt the convention for describing points as coordinate pair, e.g. (x, y).

   Make clear that the first number corresponds to the variable in the horizontal axis (the x-axis) and the second number corresponds to the vertical axis (the y-axis). You can also explain that since the numbers have to go in order, they are called ordered pairs or coordinate pairs. Each number is called a coordinate. The first coordinate is the x-value; and the second coordinate is the y-value.

   Consider the point (3,7):

   > The first (x) coordinate, 3, says that the point lies somewhere on a (projection) line going through the horizontal axis (x-axis) at 3.
   >
   > The second (y) coordinate, 7, says that the same point lies somewhere on a (projection) line going through the vertical axis (y-axis) at 7.
   >
   > There is only one place on the graph where these two conditions ($x=3$, $y=7$) are both true at the same time.

3. Expanding children's understandings

Are there equivalent tables, that is, tables that yield the same share even though the total number of candy bars or the total number of persons may vary? How is equivalence manifested in the Cartesian space?

Chose another ratio to discuss. How many candy bars does each person get?

Ask the students to show, approximately, where the points for half a candy bar per person would lie and what it would mean in this context.

Ask the students to show, approximately, where the points for two candy bars per person would lie and what it would mean.

Finally ask where, approximately, the points for three candy bars per person would lie and what it would mean.

4. Homework (Page 3)

Children will represent tables with equivalent ratios on the graph.

Overhead and Handout **(Page 1)**

Name: _____ Date: _____

Table A has 6 candy bars and 4 persons.
Table B has 5 candy bars and 2 persons.
Table C has 3 candy bars and 6 persons.
Table D has 1 candy bar and 2 persons.

1. Show how you could share the candy bars equally among those at table A.

2. Show how you could share the candy bars equally among those at table B.

3. Show how you could share the candy bars equally among those at table C.

4. Show how you could share the candy bars equally among those at table D.

5. What number is the result of $6 \div 4$?

6. What number is the result of $5 \div 2$?

7. What number is the result of $3 \div 6$?

8. What number is the result of $1 \div 2$?

Overhead and Handout **(Page 2)**

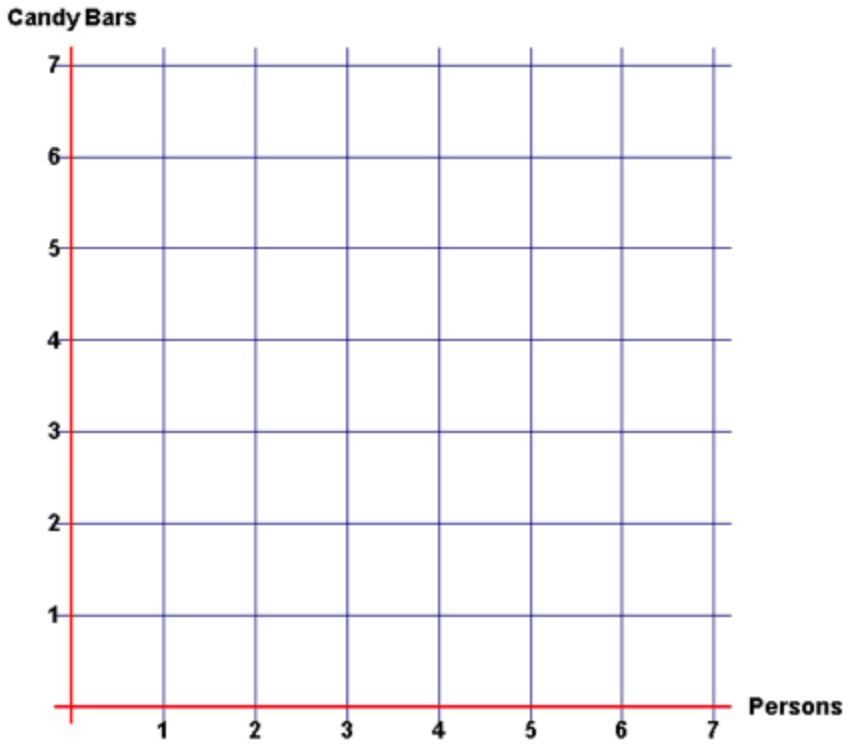
Name: _____ Date: _____

1. Show in the graph below:

A: The table that has 6 candy bars and 4 chairs.
B: The table that has 5 candy bars and 2 chairs.
C: The table that has 3 candy bars and 6 chairs.
D: The table that has 1 candy bar and 2 chairs.

Label each point with the corresponding letter and write the coordinates for each point.

For example, the table that has 5 candy bars and 2 persons should be labeled **B**=(2, 5).

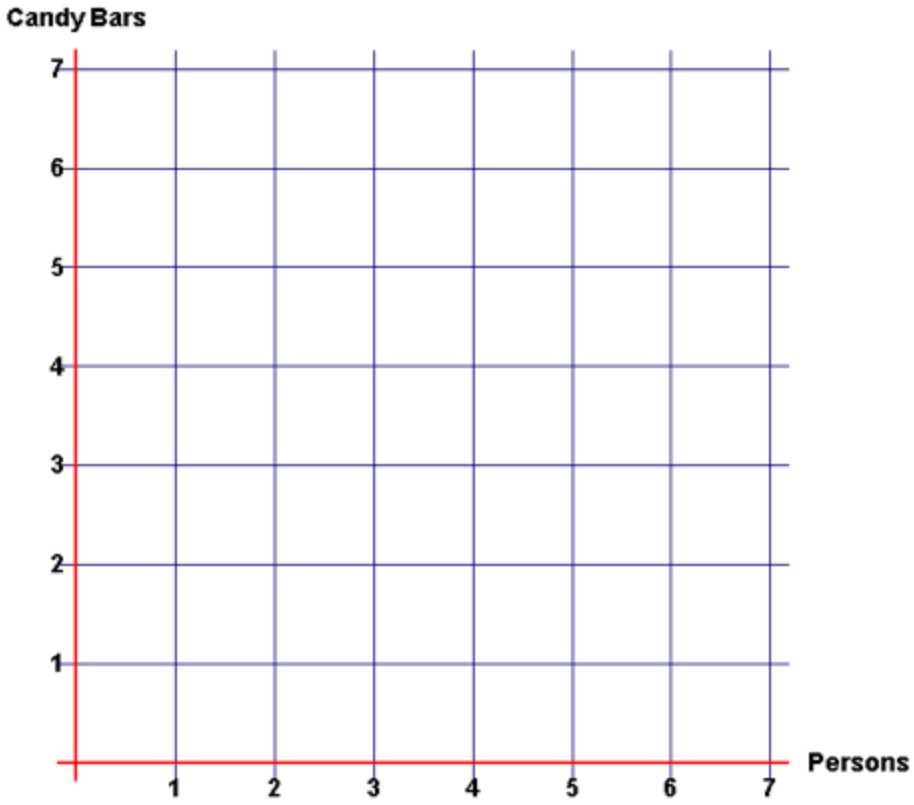


2. Show in the graph all the place**s** where the tables would give one candy bar per person.

3. Would the points for tables that give half a candy bar per person fall above or below the points for tables that give one candy bar per person?

Overhead and Homework **(Page 3)**

Name: _____ Date: _____



Show in the graph above:

1. Circle the points that correspond to all the tables that will give two candy bars per person.

2. Make an x on the points that correspond to all the tables that will give half a candy bar per person.

3. Write the coordinates for all the points that you marked in the graph. For example, the table that has 2 candy bars and 1 person should be labeled (1,2).

4. Are there any points that fall on a straight line?