



# Beanbag

THE BASICS	THE TOOLBOX	EDUCATION STANDARDS	Algebra Math Standard:	
 Grade Level: K-12   Estimated Time: 30 min.	<ul style="list-style-type: none"> <li>• 1/3 cup of a mixture of five types of assorted dried beans (red, lima, black, and pinto beans and black-eyed peas)</li> <li>• Paper cup or paper plate</li> <li>• 8 sandwich bags</li> <li>• Activity sheet</li> </ul>	<th data-bbox="621 569 841 785">SAFETY CONCERNS</th> <td data-bbox="841 569 1430 785">                     Do not allow students to put uncooked beans into their mouth.                 </td>	SAFETY CONCERNS	Do not allow students to put uncooked beans into their mouth.
		<th data-bbox="621 785 841 1008">FOR KIDS WITH DISABILITIES</th> <td data-bbox="841 785 1430 1008">                     Mobility-impaired students may need larger objects to manipulate. Visually-impaired students may use distinctly shaped beans or pasta.                 </td>	FOR KIDS WITH DISABILITIES	Mobility-impaired students may need larger objects to manipulate. Visually-impaired students may use distinctly shaped beans or pasta.



**Educational Objective:**

To develop thinking skills. To learn to see numerical relationships and how to solve complex problems by manipulating objects and solving equations.

**What to Do:**

- Assemble enough materials.
- Make copies of the activity sheet.

**Questions to Ask Students As They Do This Activity:**

- How many ways can you think of to sort the beans?
- How would you describe each of the groups you have made?
- Can you set up a ratio or an equation to help you determine the answer?
- Why do some problems have one correct answer while other problems may have more than one correct answer?

**Why It Happens:**

There are many different ways to sort beans, laundry, tableware, books,

and other things. By challenging students to sort the same items using different categories, the students develop thinking skills by looking at the same problem in different ways.

When students solve problems using manipulatives, the solution almost reveals itself. Students develop confidence in their answers even when they differ from those of their neighbors.

**Where To Go From Here:**

Use beans as counters. Plan your next party or camping trip by solving problems with beans, such as how many bottles of soda will be needed if it takes one bottle for every four people.

## WEB SITES

- **The Truth Tree's Math & Logic Board**  
<http://www.truthtree.com/mathdoor.html> (Grades 6-12)
- **Erich's Puzzle Palace**  
<http://www.stetson.edu/~efriedma/puzzle.html> (Grades 5-12)

## SOFTWARE

- **Algebra World**  
Cognitive Technologies Corporation, 1998 (Grades 7-9)
- **CornerStone Mathematics**  
SkillsBank Corporation, 1996 (Grades 3-8)

## READING ROOM

- Hewitt, Sally. **Sorting and Sets**. Raintree Steck-Vaughn, 1996. (Grades K-4)
- Ifrah, Georges. **The Universal History of Numbers**. Wiley, 2000. (Grades 9 and up.)
- Pluckrose, Henry. **Sorting**. Children's Press, 1995. (Grades K-2)

## Career Connections

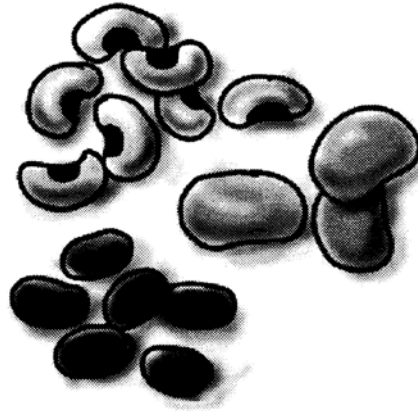
A mathematical modeler uses and solves equations to describe how a real world system behaves. Mathematics can be used to solve problems in such diverse fields as medicine, economics, computer science, physics, psychology, engineering, and social science.

## BEANBAG ACTIVITY SHEET

You will need a mixture of different kinds of beans. (Or pastas, socks, jewelry, nuts & bolts, etc.)

### Bean Sort

1. With your partner, sort all the beans into different piles according to a rule you make up. How many piles did you make?
2. Now group the beans according to a different rule. Be sure to use all of the beans. How many piles did you make?
3. Keep changing the rule and making different piles. How many different rules can you create to sort your pile of beans? List them below.



### Bag the Beans:

You are going to pack 8 bean bags following the directions, or rules, described below. Each bag contains three kinds of beans: Black, Lima, and Red. Read each description and figure out how many beans of each kind go in each bag. You may wish to use your beans to help you figure this out.

1. This bag contains one fewer Lima bean than Red beans. There are four more Black beans than Lima beans. There are 11 beans in all.
2. This bag contains 18 beans total. One third of the beans are Red. One half of the remaining beans are Black. How many Lima beans should go in the bag?
3. This bag contains twice as many Black beans as Red beans. There are 8 Lima beans. There are equal numbers of Lima and Black beans.

4. This bag contains a total of 14 beans. There are four more Black beans than Red beans. There are four times as many Black beans as there are Lima beans.
5. This bag contains an equal number of Lima beans and Black beans. There is one less Red bean than there are Black beans. There are no more than 10 Red beans.
6. This bag contains at least 15 beans. There is one more Lima bean than Red beans. There is one more Red bean than Black beans.
7. This bag contains at least 8 beans. There are three times as many Red beans as Black beans. There is one more Lima bean than Red beans.
8. This bag contains an equal number of Red beans and Lima beans. There are six more Black beans than Red beans. There are no more than 24 beans total.

**The Challenge:**

Make up rules for filling bags for your partner to solve.

<b>Answers to Bag the Beans</b>				
<b>Bag</b>	<b>Lima Beans</b>	<b>Red Beans</b>	<b>Black Beans</b>	<b>Total</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>11</b>
<b>2</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>18</b>
<b>3</b>	<b>8</b>	<b>4</b>	<b>8</b>	<b>20</b>
<b>4</b>	<b>2</b>	<b>4</b>	<b>8</b>	<b>14</b>
<b>5</b>	<b>11</b>	<b>10</b>	<b>11</b>	<b>32 *</b>
<b>6</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>18 *</b>
<b>7</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>8 *</b>
<b>8</b>	<b>6</b>	<b>6</b>	<b>12</b>	<b>24 *</b>
<b>* There are several correct answers. This is only one possible solution.</b>				