Lesson 17: Mixture Problems

Classwork

Opening Exercise

Imagine you have two equally sized containers. One is pure water, and the other is water and juice. If you combined them, what percent of juice would be the result?

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1st liquid | 2nd liquid | Resulting liquid |
| Amount of liquid (gallons) |  |  |  |
| Amount of pure juice (gallons) |  |  |  |

If a -gallon container of pure juice is added to gallons of water, what percent of the mixture is pure juice?

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1st liquid | 2nd liquid | Resulting liquid |
| Amount of liquid (gallons) |  |  |  |
| Amount of pure juice (gallons) |  |  |  |

If a -gallon container of juice mixture that is pure juice is added to gallons of water, what percent of the mixture is pure juice?

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1st liquid | 2nd liquid | Resulting liquid |
| Amount of liquid (gallons) |  |  |  |
| Amount of pure juice (gallons) |  |  |  |

If a -gallon juice cocktail that is pure juice is added to gallons of pure juice, what percent of the resulting mixture is pure juice?

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1st liquid | 2nd liquid | Resulting liquid |
| Amount of liquid (gallons) |  |  |  |
| Amount of pure juice (gallons) |  |  |  |

Example 1

A -gallon container of trail mix is nuts. Another trail mix is added to it, resulting in a -gallon container of trail mix that is nuts.

* 1. Write an equation to describe the relationships in this situation.
	2. Explain in words how each part of the equation relates to the situation.
	3. What percent of the second trail mix is nuts?

Exercise 1

Represent each situation using an equation, and show all steps in the solution process.

* 1. A -pint mixture that is oil is added to a -pint mixture that is oil. What percent of the resulting mixture is oil?
	2. An -ounce gold chain of gold was made from a melted down -ounce charm of gold and a golden locket. What percent of the locket was pure gold?
	3. In a science lab, two containers are filled with mixtures. The first container is filled with a mixture that is acid. The second container is filled with a mixture that is acid, and the second container is larger than the first. The first and second containers are then emptied into a third container. What percent of acid is in the third container?

Example 2

Soil that contains clay is added to soil that contains clay to create gallons of soil containing clay. How much of each of the soils was combined?

Exercise 2

The equation is used to model a mixture problem.

* 1. How many units are in the total mixture?
	2. What percents relate to the two solutions that are combined to make the final mixture?
	3. The two solutions combine to make of what percent solution?
	4. When the amount of a resulting solution is given (for instance, gallons) but the amounts of the mixing solutions are unknown, how are the amounts of the mixing solutions represented?

Lesson Summary

* Mixture problems deal with quantities of solutions and mixtures.
* The general structure of the expressions for mixture problems are

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* Using this structure makes the equation resemble the following:

Problem Set

1. A -liter cleaning solution contains bleach. A -liter cleaning solution contains bleach. What percent of bleach is obtained by putting the two mixtures together?
2. A container is ﬁlled with grams of bird feed that is seed. How many grams of bird feed containing seed must be added to get bird feed that is seed?
3. A container is ﬁlled with grams of bird feed that is seed. Tom and Sally want to mix the grams with bird feed that is seed to get a mixture that is seed. Tom wants to add grams of the seed, and Sally wants to add grams of the seed mix. What will be the percent of seed if Tom adds grams? What will be the percent of seed if Sally adds grams? How much do you think should be added to get seed?
4. Jeanie likes mixing leftover salad dressings together to make new dressings. She combined of a vinegar salad dressing with of another dressing to make of salad dressing that is vinegar. What percent of the second salad dressing was vinegar?
5. Anna wants to make of a salt solution by mixing together a salt solution and a salt solution. How much of each solution must she use?
6. A mixed bag of candy is chocolate bars and other filler candy. Of the chocolate bars, of them contains caramel. Of the other filler candy, of them contain caramel. What percent of candy contains caramel?
7. A local fish market receives the daily catch of two local fishermen. The first fisherman’s catch was fish while the rest was other non-fish items. The second fisherman’s catch was fish while the rest was other non-fish items. If the fish market receives of its catch from the first fisherman and from the second, what was the percent of other non-fish items the local fish market bought from the fishermen altogether?