

## Predictions Based on Experimental Probabilities

A bottling company puts apple juice into plastic bottles. Each bottle is supposed to have 8 ounces of juice. If bottles have too much juice, the company loses money. If they have too little, consumers may not purchase the product. The quality control department cannot inspect all of the bottles, so it looks at a few from each batch.

A worker inspects 400 bottles. Eight are improperly filled. Based on these data, what is the probability that a randomly chosen bottle has too much or too little juice?

Find the experimental probability:

$P(\text{improper fill})$

$$= \frac{\text{number of bottles improperly filled}}{\text{total number inspected}}$$

$$= \frac{8}{400} = 0.02$$

The probability is 0.02 or 2%.

If the company produces 15,000 bottles of juice each week, predict the number of bottles that will be improperly filled.

Use the probability

$$P(\text{improper fill}) = 0.02$$

to predict the number.

$$0.02 \times 15,000 = 300$$

About 300 bottles will be improperly filled.

### Solve. Show your work.

- The Rainbow Crayon Company ships crayons in large boxes to other companies for packaging. The crayons in each box should not be broken. The quality control department cannot inspect all of the crayons, so it examines a few boxes from each shipment. A worker inspects 600 crayons. Twenty-four are broken. Based on these data, what is the probability that a randomly chosen crayon is broken?  
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- The Rainbow Crayon Company adjusts its packaging. When 500 crayons are inspected, eight are found broken. Has the probability of a broken crayon changed? Explain.  
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- The Rainbow Crayon Company ships 18,000 crayons each week. Predict the number of broken crayons that would be shipped with the old packaging.  
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- Predict the number of broken crayons that would be shipped each week with the new packaging.  
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- What is the probability with the new shipping that a crayon will not be broken?  
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