

# LAUNCH INTO MATH

## Exercise 6: Percentages

From engineers to computer scientists to statisticians, the Artemis program relies on math whizzes of all kinds. In the exercise below, learn how NASA's food scientists use percentages to prepare food for crewed Artemis missions.

Feel free to use a calculator for these exercises... unless you really love long multiplication and division.

### Food For Thought

Space food needs to be more than just tasty—it also needs to take up minimal space and provide enough calories to keep astronauts strong and healthy. (Basically, it's one big math problem.) One way to dramatically decrease the mass of food to prepare it for space travel is through **dehydration**, which means removing the moisture from something. Once in space, astronauts rehydrate their food before eating it.

### Breakfast of Champions

**Problem 1:** Let's say you are rehydrating eggs for a super scrumptious space breakfast. The mass of the dehydrated eggs is 2.2 ounces (oz). **If you add 1.8 oz of water, what is the percentage of rehydration?**

Dehydrated mass: 2.2 oz

Gain in mass: 1.8 oz

% Rehydration:  $\frac{\text{gain in mass} + \text{dehydrated mass}}{\text{dehydrated mass}} \cdot 100$

**Problem 2:** Let's say you want some delicious oatmeal to go with your eggs, and you like your oatmeal a little thick. **For 28 grams of oatmeal to absorb 90% of its mass in water, how much water must be added?**

Dehydrated mass: 28 grams

% Rehydration: 190%



### Meet the Artemis Team

What's on the menu? Just ask Xulei Wu, a senior food scientist at NASA's Johnson Space Center. Xulei finds creative ways to process food for space travel—including 3D-printing it! Read more about how space food is created [here](#).

### Additional Resources

[NASA Careers Video](#)

[Food for Thought: Eating in Space Educator Guide](#)

Houston, We Have a Podcast episode: [Space Food](#)

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## Solutions to Exercise 6: Percentages

### Breakfast of Champions

**Problem 1:** Let's say you are rehydrating eggs for a super scrumptious space breakfast. The mass of the dehydrated eggs is 2.2 oz. **If you add 1.8 oz of water, what is the percentage of rehydration?**

#### Measurements and Formulas:

Dehydrated mass: 2.2 oz

Gain in mass: 1.8 oz

% Rehydration:  $\frac{\text{gain in mass} + \text{dehydrated mass}}{\text{dehydrated mass}} \cdot 100$

#### Solution:

% Rehydration:  $\frac{1.8 \text{ oz} + 2.2 \text{ oz}}{2.2 \text{ oz}} \cdot 100 = \frac{4 \text{ oz}}{2.2 \text{ oz}} \cdot 100 \approx 1.82 \cdot 100 = 182\%$

**Final solution:** If you add 1.8 oz of water to the dehydrated eggs, they will be **82% rehydrated**.

**Problem 2:** Let's say you want some delicious oatmeal to go with your eggs, and you like your oatmeal a little thick. **For 28 grams of oatmeal to absorb 90% of its mass in water, how much water must be added?**

#### Solution:

% Rehydration:  $190 = \frac{\text{gain in mass} + 28 \text{ grams}}{28 \text{ grams}} \cdot 100$

$$\longrightarrow \frac{190}{100} = 1.90 = \frac{\text{gain in mass} + 28 \text{ grams}}{28 \text{ grams}}$$

$$\longrightarrow 1.90 \cdot 28 \text{ grams} = 53.2 \text{ grams} = \text{gain in mass} + 28 \text{ grams}$$

$$\longrightarrow 53.2 \text{ grams} - 28 \text{ grams} = 25.2 \text{ grams} = \text{gain in mass}$$

**Final solution:** For the oatmeal to absorb 90% of its mass in water, **25.2 grams of water** must be added.

