

# Isotopes of Pennies

## Lab Sheet



You will do a lab that will deal with isotopes, mass number, and atomic mass. Before you begin your work in the lab, try to explain these terms in your own words. After you have finished the lab, you will have a chance to revise your explanations based on what you have learned in the activity.

### Isotope

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### Mass number

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### Atomic mass

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## Lab Sheet

### Part B

1. Obtain a sample containing six old pennies and four new pennies.
  2. Using the mass of an old penny and a new penny from part A above, calculate a weighted average mass for this sample of pennies. You need to find the mass of all ten pennies and divide by ten to find the weighted average mass. \_\_\_\_\_g
  3. Now weigh your sample of pennies. Record the mass. \_\_\_\_\_g
  4. Divide the mass of your sample of ten pennies by ten to find the actual average mass of a penny in this sample. \_\_\_\_\_g
- Compare your answer from number two to your answer for number four. Is the weighted average mass closer to the mass of an old penny or a new penny? Why?

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### Part C: The Mystery Sample

1. Return your sample of ten pennies from part B to your teacher. Get a canister of pennies. **Don't open it.** Record its identifying number or letter: \_\_\_\_\_
2. Record the mass of the empty film canister, which is on the label of the canister. \_\_\_\_\_g
3. Weigh the sealed film canister containing ten mixed pennies. \_\_\_\_\_g
4. Return the canister to your teacher.

### Calculations:

- Calculate the number of old and new pennies in your canister:
  - Since the total number of pennies is ten, we can say that there are  $x$  old pennies plus  $10 - x$  new pennies. The total mass of the pennies (canister with pennies minus the mass of the canister) is useful here.
  - $x$  times the average mass of an old penny plus  $(10 - x)$  times the average mass of a new penny equals the total mass of the pennies in the canister. Set up an equation and solve for  $x$ . Then you will know how many old pennies are in your canister. Subtract that number from ten to find the number of new pennies that are in your canister.
  - Show your math here:
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- How many old pennies do you have? \_\_\_\_\_
  - How many new pennies do you have? \_\_\_\_\_
  - What percentage of old and new pennies do you have?