# Science Notebook Layout **DON'T COPY UNDERLINED TEXT**

**Mrs. Aguirre's Webpage:** http://www.quia.com/profiles/caguirre

## Tape in Reading Pages

### Inside an atom: solving the puzzle

**The electron identified**

The first strong evidence that something existed smaller than an atom came in 1897. English physicist J. J. Thomson discovered that electricity passing through a gas caused the gas to give off particles that were too small to be atoms. Thomson's new particles also had negative electric charge while atoms have zero electric charge. Thomson called his particles *corpuscles*, which were eventually named **electrons**, and proposed that they came from the inside of atoms.

**The proton and the nucleus discovered**

In 1911, Ernest Rutherford, Hans Geiger, and Ernest Marsden did a clever experiment to test Thomson's model of the atom. They launched positively-charged helium ions (a charged atom is called an *ion*) at extremely thin gold foil (Figure 6.3). They expected the helium ions to be deflected a small amount as they passed through the foil. However, a few bounced back in the direction they came! The unexpected result prompted Rutherford to remark "*it was as if you fired a five inch (artillery) shell at a piece of tissue paper and it came back and hit you!*"

**The nuclear model of the atom**

The best way to explain the pass-through result was if the gold atoms were mostly empty space, allowing most of the helium ions to go through virtually undeflected. The best way to explain the bounce-back result was if nearly all the mass of a gold atom were concentrated in a tiny, hard core at the center. Further experiments confirmed Rutherford's ideas and we know that every atom has a tiny **nucleus**, which contains more than 99% of the atom's mass.

**The neutron**

The positively charged **proton** was soon discovered and shown to be the particle in the nucleus. But there still was a serious problem with the atomic model. Protons could only account for about half the observed mass. This problem was solved in 1932 by James Chadwick. Chadwick's experiments revealed another particle in the nucleus which has no electric charge and similar mass as the proton. Chadwicks neutral particle was named the **neutron**.





## Atom Reading: NB Page 61 1/11/12

**1. Individual Reflection**

**Reflect/ Make predictions about the reading:**

- **How hard was it?**
- **How did you adjust your reading processes to get through it?**
- **What did you already know that helped?**

**2. Preview the text**

**Scan the text.**

**Find and mark new, unfamiliar terms and familiar words or terms that the author uses in an unfamiliar way**

**Look for interesting words, science words, words you do not know (not necessarily science words)**

**3. Survival Words**

**Write a few of the terms you marked that you predict are important to the reading in the left column (survival words). Make notes indicating WHY you picked each word and what you think it might MEAN.**

| My Survival Words | Rating A,B,C,D | WHY I picked it | Meaning |
|---|---|---|---|
| | | | |

**4. Word detective**

**Re-read the text and try to make sense of the survival words. For each word make notes about <u>what it might mean</u> and how you figured it out**

**5. Connections/ Final Reflection**

**How did this activity go for you?**

**What was hard?**

**How did it help you make sense of the reading?**

**What do you want to remember?**