

**Activity #3 – Dream Journey into the Atom (The Particle Picture)**

You will need to use the poster [here](#). (You may get a print-out of this poster from your teacher if you wish.) Matter is made of tiny particles. And those particles are made of even tinier particles ... Name the particles described in the clues. You will find all of the answers in the poster.

1	Brownian motion: You see these microscopic specks of dust or smoke moving around ...									
2	... because we believe they are pushed about by these particles of the air ...									
3	... which are made up of these particles of oxygen and nitrogen.									
4	JJ Thomson discovered these particles ...									
5	... which orbit around this particle at the center of every atom ...									
6	... which is made up of these positively-charged particles ...									
7	... and these uncharged ones ...									
8	... which are made up of these even tinier particles.									

Now, use the 11 letters in the highlighted boxes to make a word which is the name of a machine used for making sub-atomic particles move faster.

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*At the start of the twentieth century, there was no way that scientists could hope to see individual atoms. Indeed, many scientists still did not accept that matter was made of atoms.*

## **Activity #4 – Dream Journey into the Atom (Changing Pictures)**

*At the start of the twentieth century, there was no way that scientists could hope to see individual atoms. Indeed, many scientists still did not accept that matter was made of atoms. Since then, some very clever experiments have allowed us to find out a lot more about the structure of atoms. Our picture of the atom has changed a lot.*

*(You will find the answers to these questions in the [poster](#).)*

### **1) Model 1: The ‘pudding’ model**

In the pudding model:

- a) What is the dough? What charge does it have?
- b) What are the currants? What charge do they have?
- c) Why must there be equal amounts of positive and negative charge?

### **2) Model 2: The ‘nuclear’ model**

In the nuclear model:

- a) What is at the center of the atom? What charge does it have?
- b) What particles orbit around the outside? What charge do they have?

### **3) Changing models**

Ernest Rutherford suggested an experiment to test the pudding model.

- a) What metal did he use as his target?
- b) Which particles did he fire at the target?
- c) What was the source of the particles?
- d) If the pudding model was correct, what would happen to the particles?
- e) What was the surprising result of the experiment?
- f) How did Rutherford account for this result?

### **4) Changing ideas**

The word **atom** means **indivisible**.

- a) Is an atom indivisible?
- b) Why do you think we stick with the word **atom**?

### Activity #5 – Dream Journey into the Atom (Particles & People Puzzle)

Use the [poster](#) to solve these clues:

1. In 1897, I made a beam of electrons in a vacuum tube. Who am I?	
2. You'll find me in an atom and in a lightning flash. I sometimes travel along wires. I'm naturally negative! What am I?	
3. It was a surprise to me when an alpha particle bounced back! My prediction was completely wrong! Who am I?	
4. I may be small, but I'm a lot heavier than those electrons. Maybe that's why they orbit around me! What am I?	
5. I'm using electrons to study what is inside protons. Who am I and where do I work?	
6. I am one of these: a molecule, a proton, an electron, an atom or a nucleus. I'm the only one of these who isn't made up of other particles. What am I?	
7. Jude uses me in a beam with loads of others just like me so that she can look into new materials. What am I?	
8. I work on the world's biggest particle accelerator looking for answers to big questions. Who am I and where is the accelerator?	
9. Gavin is working on me. I am going to be the new version of the World Wide Web! What am I?	
10. I use work done in particle physics experiments to make better X-ray detectors which should help us to treat cancer. Who am I?	

The next two of these have answers but not clues! Can you think of good clues for them?

11.	Quark
12.	Molecule