Science 10 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Blk: \_\_\_\_\_\_

“Meet the Scientists!”

Objective: To investigate the atomic structure from a historic perspective.

The project includes:

**1. Research 2. Project 3. Individual newspaper article**

* The research and presentation are to be done in groups of 2-4, depending on which scientist(s) you choose. Each group consists of an interviewer and a scientist or a group of scientists.
* The journal article is an individual assignment.

Timeline:

* 1 period research (Tuesday)
* 1 period project work (Thursday)
* 1 periods for the presentations (Next Thuesday)
* All other preparations are to be completed outside the classroom.

Expectations:

# Part I: Research

* Resources: Use a minimum of 4 resources, at least one book (text book, magazine or encyclopedia) and one reliable website.
* Bibliography: Reference your sources of information using the proper format (check the following website: ). **Submit your TYPED bibliography with Part III, your journal article.**
* Take notes of the following information
  + Name of the scientist(s)
  + When and where was the scientist born?
  + Nationality & lifespan
  + Major achievements and contributions, e.g. Nobel Prizes, inventions, discoveries, theories and hypotheses (Note: Your focus is to relate these to the development of the atomic theory, see “Scientists at a Glance” handout.)
  + Other interesting facts++++++

# Part II: Project (Total: 20 marks)

* Presentation Time limit: 3-5 min (1 scientist); 5-7 min (More than 1 scientist)
* Formats:
  1. Simulating a life interview, students role-play the scientist(s) and the interviewer to report, discuss and present the facts and theories relating to the internal structure of an atom. (live or filmed) Costumes & Acting required.
  2. Create a poster with a 50/50 mix of information and artwork.
  3. Create a video documentary using windows movie maker or other applicable software. Audio commentary is a must.
  4. Create and present a 3D model.
* Q & A: Be prepared to answer questions from your classmates & Mr. Standring after the presentation.

# Part III: Individual Written Article (Total: 20 marks)

* Each person submits one written assignment.
* Format: It is to be presented in the format of a journal article on an A4 paper. Your article must be **TYPED**. Include graphics and pictures. Include your references.
* Length: Do not exceed one page. The article should be about **200-250 words**.
* Plagiarism (copying from a book, website, or friend) is considered cheating and will be result in a zero. **Use your own words**. Copying one sentence directly is still plagiarism!

Criteria for Success on Meet the Scientist

All projects must include:

* + Name of the scientist(s)
  + When and where was the scientist born?
  + Nationality & lifespan
  + Major achievements and contributions, e.g. Nobel Prizes, inventions, discoveries, theories and hypotheses (Note: Your focus is to relate these to the development of the atomic theory, see “Scientists at a Glance” handout.)
  + Other interesting facts

1. PowerPoint
   1. Each Slide should contain more picture than text
   2. A picture of your scientist
   3. One or more pictures of their model(s)
   4. When presenting your PPT You should not be reading your slides (explain your ideas)
      1. This does not apply if your PPT has an audio track
   5. Be able to answer questions from your audience about your scientist.
2. Poster
   1. 50/50 mix of information and artwork
   2. A picture of your scientist
   3. One or more pictures of their model(s)
   4. Pictures must be a minimum of 50% your own art (up to 50% computer print outs is OK)
   5. Very neat
   6. Looks Attractive
   7. Be able to answer questions from your audience about your scientist.
3. Video
   1. Be Theatrical
   2. Clear Video & Audio
   3. Editing (no unneeded parts)
   4. Bibliography of sources in credits
   5. An explanation of their model

## **Scientists At A Glance**

Use this chart to focus your research on the right topic for your discussion during the presentation and your journal article. However, these are not the only points you should include in your project.

|  |  |  |  |
| --- | --- | --- | --- |
| **Scientist(s)** | **Key Achievements Relevant to the Study of Atoms:** | **Contribution to Understanding the Atom** | **Some Suggested Examples of Visuals You Could Use** |
| John Dalton | Known as father of modern atomic theory; Dalton’s Atomic Theory. | Described the relationship between elements and compounds | Ball-and-stick models of compounds with varied atomic ratios |
| Dimitri Mendeleev | Credited with developing the modern periodic table. | The periodic table can be used to predict physical and chemical properties of elements | Display the different forms of periodic tables through time |
| Marie Curie,  Pierre Curie, &  Henri Becquerel | Discovered certain radioactive elements and radioactivity. | Radiation is linked to the internal structure of the atom | Use a diagram to explain the 3 types of radioactive decay and the source of radioactivity; examples of some applications of radioactivity |
| J.J. Thomson | Discovered electrons; contributed to the development of mass spectrometer. | Electrons are contained within atoms | Diagram and use of a cathode ray tube |
| Ernest Rutherford | Coined terms for alpha, beta and gamma rays; discovered the nucleus using the gold foil experiment. | The nucleus contains majority of the atom’s mass; nucleus contains positive charge; electrons revolve around nucleus | Diagram of gold foil experiment |
| Niels Bohr | Theorized that electrons occupy certain energy levels; the Bohr model can explain the observation of spectra lines. | Electrons orbit the nucleus in discrete paths | Illustration of Bohr’s atomic model; line spectra of various elements |
| Werner Heisenberg | Developed the Heisenberg Uncertainty Principle. | Electrons locations are described as areas of probability | Maps of probability density |
| Erwin Schrodinger | Merged the Heisenberg Uncertainty Principle and concept of wave-particle duality of atoms; devised the wave equation to describe atomic orbitals. | Electrons reside in atomic orbitals of various shapes and energies | Models of various atomic orbitals, e.g. s, p, d, f orbitals |
| Robert Bunsen &  Gustav Kirchhoff | Jointly invented the spectroscope; Bunsen improved the Bunsen burner which aid their spectral analysis. | Applied spectroscopy to analyze elements | Examples of line spectrums, spectroscope, Bunsen burner |
| Robert Miliken | Won the Nobel Prize in physics in 1923 for his study of the elementary electronic charge and the photoelectric effect. | Determined the mass-to-charge ratio of an electron using the oil-drop experiment | Diagram of the oil-drop experiment |
| James Chadwick | Discovered neutrons. | Knowledge of the location, mass and charge of neutron | Diagram of Chadwick’s experiment in which he discovered the existence of neutrons |
| Max Karl Ernst Ludwig Planck | Discovered the relationship of energy and frequency of radiation; Planck’s constant; Quantum Theory (Mechanics) | Energy comes in discrete packets called quantum energy | Diagram of his model and equations |
| Pauli Wolfgang | Won the Nobel Prize for Physics for his discovery of the Pauli Exclusion Principle, assigned the fourth quantum number (electron spins) | No two electrons can have the exact same quantum state | Chart of the four quantum number. Use an example to explain the Pauli Exclusion Principle |