**Selecting models of atoms**

**Levels:** 5-6  
**NoS achievement aims:** Investigating in science , Communicating in science   
**Contextual strands:** Material world   
**Topic:** Atoms, ions and molecules

**Rationale**

Matter is made of atoms. Atoms can be described in many different ways.

Making and using models is as a way of clarifying concepts which otherwise would be hard to envisage. Models are well suited to investigating the nature of the atom, and allow a particular aspect of the atom to be studied. Note: Models don’t depict a physical reality; they are representations, for a particular purpose, of an aspect of a reality. No single model can explain all the features. Where something is complex, scientists pick the one that is most relevant to the aspect under investigation. For more information on models see [Teaching with models](https://scienceonline.tki.org.nz/Teaching-science/Teaching-strategies/Teaching-with-models) .

**What you need**

Illustrations showing six types of atomic models. See pdf matching items

**Focus**

* What is the structure of an atom? Can the structure easily be determined by investigation?
* Is an atom solid?
* What is found in the nucleus of an atom?
* What are the sub-atomic particles?
* How were sub-atomic particles discovered?
* Can these parts of the atom be investigated easily?
* How has the atom been described by early scientists?
* Are there different ways to think about, and draw, the structure of atoms, or does everyone think about them in the same way?

**Exploration**

1. Get students to draw their own diagrammatic model of an atom.
2. Print out copies of the [Six types of atomic model](https://scienceonline.tki.org.nz/Nature-of-science/Nature-of-science-teaching-activities/Selecting-models-of-atoms#Six) and cut each sheet into six pieces so that each model type is separate.
3. In groups, give students a set of the models. Invite them to rank the models (in their opinion) as best, better and good:
   * What criteria did you use to make your ranking?
   * Why did you choose the way you did? Why do you think the best model is better than the others?
   * Which models did you like least? Why?
4. Get the students to decide, with reasons, which model most clearly shows each of the following features of the atom or of the development of atomic models:
   * electrons move so fast it’s hard to pinpoint where they are at any one time
   * some electrons move around closer to the nucleus than others
   * the number of protons, neutrons and electrons in a specific atom
   * some scientists thought the electric charges were evenly distributed
   * ancient Greeks thought that the atom was indivisible
   * electrons move in three dimensions around the central nucleus.
5. Students redraw a diagrammatic model of their own of an atom.

**Reflection**

* What does your new drawing show? What does it not show?
* What features of your atom can you show now that you didn’t show in the first drawing (done before the activity)?
* What have you learned about atoms that you didn’t know before?
* Why is there more than one correct way of modelling an atom?
* What sort of information do you think contributed to the development of new models of atoms?

**Activity resources**

* Illustrations of the ‘Plum Pudding’ model, Orbits model (Bohr’s model), Solar system model, Electron cloud model, Periodic table representation (model represented here is the carbon atom), and the Ball model (old Greek). See pdf in same folder (matching items)