Project: What’s It Made Of?

FOR THE TEACHER

Summary
In this project each student will choose a basic everyday object (such as chalk, bleach, etc.) and conduct research to discover what compounds, molecules, and elements make up the object. The student will create a poster that will detail their object and what it’s made of including drawings of a Bohr model and numbers of subatomic particles for each related element. The student will create a question about their object’s atomic structure and create a QR code linking to the question to be used by peers as they participate in a culminating project gallery walk to observe, discuss, and learn about each poster.

Grade Level
Middle and Elementary School

NGSS Alignment
This activity will help prepare your students to meet the performance expectations in the following standards:

- **MS-PS1-1:** Develop models to describe atomic composition of simple molecules and extended structures.
- **Scientific and Engineering Practices:**
  - Obtaining, Evaluating, and Communicating Information

Objectives
By the end of this project, students should be able to

- Describe the structure of atoms, including the masses, electrical charges, and locations of protons and neutrons in the nucleus, and electrons in the electron cloud.
- Know that an element is a pure substance represented by chemical symbols.
- Differentiate between elements and compounds on the most basic level.

Chemistry Topics
This project supports students’ understanding of

- Atomic Structure
- Subatomic particles
- Bohr models
- Elements
- Compounds

Time
**Teacher Preparation:** 30 minutes
**Lesson:** 60-90 minutes

Materials
- Computers with access to the internet
- Poster paper and markers
- Devices to scan QR codes (students may use their own device)

Safety
- No specific safety precautions need to be observed for this activity.
Teacher Notes

- I suggest completing this project during 2 class periods, and/or assigning homework as needed.
- This project is designed for individual students, although you can assign student partners. Each student will choose a different object to research. The teacher can keep a running list to make sure there is no overlap.
- Students can choose a basic everyday object or the teacher can assign an object for them to research. The objects should only be composed of three or four elements.
- This project can be used in an upper elementary school classroom, by modifying the tasks slightly. For example, students could just identify elements in certain objects, and the list of objects can be predetermined by the teacher. Additionally, working in pairs would be helpful for younger students.
- Some suggested everyday objects can be found at the following websites:
  - Common Chemical Formulas
  - Elements found in household products
  - Chemistry in Everyday Life
- The student will conduct research on their object to determine the chemical formula (or the elements contained in it for lower grade levels).
- The student will create a poster including all required components listed on the rubric.
- Once research has been completed and the poster has been created, the student will then create a question about their object (atomic structure, how many elements, how many atoms, etc.)
- The student will generate a QR code that is linked to their question. There are many different free QR code generators including these websites:
  - www.qr-code-generator.com
  - www.qrstuff.com
- The QR codes will be printed and glued/taped to the student’s poster.
- All of the above will be done on day 1 of the lesson. You may need an additional day to create the QR codes if the teacher/students are unfamiliar with creating the QR codes. It is a fairly easy process once you’ve learned how to create them.
- Day 2 of the lesson will consist of the class gallery walk where students will observe, discuss, and learn about the objects that were researched.
- The students will scan the QR codes and answer the questions. The students can download the app “QR Code Reader” onto their phone and use this app to scan the QR codes.
- As a closing task, the students will write about what they learned by researching their object, by taking the gallery walk to learn about the other objects, and by answering the QR questions.
**FOR THE STUDENT**

**Lesson**

**What’s it Made Of?**

Choose a basic everyday object (such as chalk, bleach, etc.) and conduct research to discover what compounds, molecules, and elements make up the object. Some suggested everyday objects can be found at the following websites:

- [www.chemicalformula.org/chemistry-help/common-chemical-formula](http://www.chemicalformula.org/chemistry-help/common-chemical-formula)

You will then create a poster that details the object and include the following information:

- Poster title
- Illustration or drawing of the object
- Chemical Formula of the object
- Illustrated or printed out Bohr model of each element that makes up the object
- List of number of protons, neutrons, and electrons for each element that makes up the object
- List two facts about the object
- You will also be graded on your organization, layout and design, and mechanics (grammar, punctuation, and neatness)

Finally, create a question about your object’s atomic structure and create a QR code linking to the question. Print your QR code and tape it to your poster. There are many different free QR code generators including these websites:

- [www.qr-code-generator.com](http://www.qr-code-generator.com)
- [www.qrstuff.com](http://www.qrstuff.com)

**Refer to the rubric for scoring:**

**Poster**

- Illustration or printed picture of object 10 points
- Chemical Formula of object 15 points
- Illustrated or printed Bohr models of each element 15 points
- List # of protons, neutrons, and electrons for each element 15 points
- List two facts about the object 15 points
- Organization 5 points
- Layout and Design 5 points
- Mechanics (grammar, spelling, punctuation) 5 points
- Title 5 points

**QR Question**

- Create a QR Question related to your object 10 points

**Total Points**  

_____/100 points