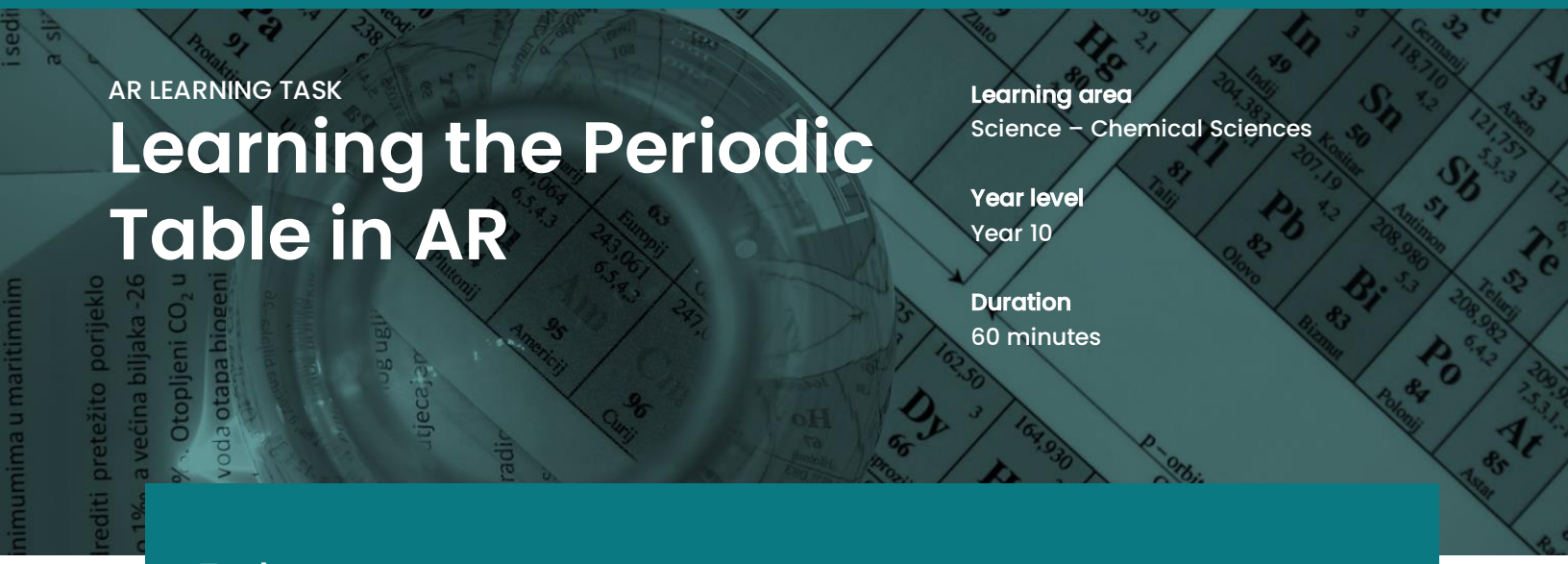

AR LEARNING TASK

# Learning the Periodic Table in AR

**Learning area**
Science – Chemical Sciences

**Year level**
Year 10

**Duration**
60 minutes

## Task summary

Using augmented reality, students examine how elements are organised in the periodic table and analyse patterns to discern that elements in the same group of the periodic table have similar properties.

## Session overview

Students can show their knowledge and understanding of the periodic table by filling in the Periodic Table template based on existing and new learning.

## Digital technologies

- ☐ VR
- ✓ AR
- ☐ Robotics
- ☐ Drones
- ☐ Other: _____

## Required resources

**Hardware:**

- Devices

**Videos:**

- The genius of Mendeleev's periodic table - Lou Serico (4:24)
  The elements had been listed and carefully arranged before Dmitri Mendeleev. They had even been organised by similar properties before. So why is Mendeelev's periodic table the one that has endured? Lou Serico explains via eka-aluminium, an element whose existence Mendeelev predicted years before it was discovered.

- Bring the Periodic Table to life with Augmented Reality (1:00)

ANSTO's Free AR experience unlocks the ANSTO periodic table to reveal a world of protons, neutrons and electrons and illustrates how useful they are to science and industry in the 21st century.

**Apps:**

- **ANSTO XR** - Download via Google Play OR Apple App Store
  *NOTE: The augmented reality feature on the ANSTO XR app supports the iOS devices listed below and various Android devices that have Android 7.0 and above. To read the full list of supported Android devices, check out this website.*
  - *Supported iOS devices: iPadPro11Inch, iPadPro1Gen, iPadPro10Inch1Gen, iPadPro10Inch2Gen, iPadPro2Gen, iPadPro3Gen, iPhone6S, iPhone6SPlus, iPhoneSE1Gen, iPhone8, iPhone8Plus, iPhone7, iPhone7Plus, iPhoneX, iPhoneXS, iPhoneXSMax, iPhoneXR*

**YouTube** - This needs to be whitelisted and downloaded on your devices.

**Teaching Resources**:

- Teaching deck – this is a slide deck template that teachers can download and use for this learning task.

**Student Task:**

- **The Periodic Table of Elements Template** using Canva.
- **Periodic Table of Elements** (PDF) - Poster to be printed on an A3 sheet and to be used with the ANSTO XR app. Ideally, one poster per 2 to 3 students.

## Other resources to try (optional)

**Website**:

- Interactive Periodic Table - A website where students can learn about the periodic table - looking at properties, electrons, isotopes, and compounds.

**Apps:**

- **Atom Builder (web)** - Build stable and radioactive isotopes using neutrons, protons and electrons with the ANSTO Atom Builder. Discover the uses and properties of common isotopes, and locate elements in the periodic table.
- **Elementals (web/iOS)** - A fun educational app for learning the Periodic Table.

## Planning and preparation

**Assumptions**

Students are expected to:

- have some background knowledge about elements and their atomic structures and properties.
- have some background knowledge in Augmented Reality (AR) and understand the basics of this technology.

**Additional preparations for teachers**

- Make sure that the ANSTO XR app (and additional apps if being used) are installed and working properly.
- Check that all student devices are fully charged and updated.
- Print A3 copies of ANSTO's Periodic Table of Elements (PDF) for one between two students.



Developed by Shai Coggins & Naomi Guglielmo

## Task Sequence

**1**

**Introductory activity / Provocation**
(5 mins)

Show students the video The genius of Mendeleev's periodic table - Lou Serico (4:25) using slide 2 of the teaching deck.

Discuss the following questions (found on slide 3):

- What did you learn about the periodic table from this video?
- How was the first periodic table different from the current periodic table?
- How did Mendeleev know about the properties of an element just based on its location on the periodic table? (eg, Eka Aluminium example, later known as Gallum)

Extend the discussion and ask students what are the different types of information that they can find on a periodic table (e.g., name of element, symbol, atomic structure, electron configuration, type of element, etc). What do they think the different colours for the elements means?

**2**

**Prior knowledge check**
(10 - 15 mins)

In small groups of 2 or 3, ask students to fill in the Canva template: The Periodic Table of Elements Template *(the link is found on slide 4 of the teaching deck)* to the best of their ability.

Students need to add the information (e.g. name of element, symbol, atomic structure, electron configuration, type of element) for the elements that they think they KNOW about and leave the boxes of the elements that they are still PUZZLED about.

Ask students to then record how they are going to EXPLORE the elements that they are puzzled about? Where will they get their information from?

You can gamify this task by putting the timer up for about 10 minutes to see how many elements they can add to the table. See how many correct answers each group managed to complete in the allocated time. The goal is not to complete the table during this part of the activity, but to see how many they will be able to identify correctly within a time limit.

If students are unable to complete the task, you can encourage them to use a website like Interactive Periodic Table to help them.

**3**

**Activities**
(25 - 30 mins)

Ask students to share their filled-in Periodic Tables with a partner.

Using slide 6 of the teaching deck to watch Bring the Periodic Table to life with Augmented Reality (1:00) to see the ANSTO XR App in action.

Tell the students that they're going to explore some elements on the periodic table with Augmented Reality (AR) technology using ANSTO's XR app. Show students how to scan ANSTO's Periodic Table of Elements poster and how to find information about different elements on the app.

In pairs, ask students to add or change information on their **The Periodic Table of Elements** using Canva. based on what they learn using the app.



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# 4

## Check for understanding
(5 - 10 mins)

Ask students to share their Periodic Table of Elements Template either in small groups or as a class.

Teachers can check the following in the students' templates:

- How many elements were the students able to fill in?
- Did the students add the correct information?

Teachers may also want to put up the blank template on an interactive whiteboard or smartboard and get students to fill in the information as a class.

| Differentiation for students with additional needs | Extension ideas | Video tips |
|---|---|---|
| Students may opt to have a limited number of elements to identify on the template and/or have some elements and information already pre-filled in as examples/guides. | Get students to add more information on to a different document, such as identifying real world uses of each element.<br><br>Encourage students to try ANSTO's Atom Builder (Web) and/or Elementals (Web/iOS) to help them practise learning their Periodic Table. | The video for this learning demonstrates how to scan the Periodic Table of Elements poster with the device, as well as how to bring up different information about the elements available. |



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## Curriculum Connections

### Australian Curriculum Version 9.0

**Year 10 - Science**
Explain how the structure and properties of atoms relate to the organisation of the elements in the periodic table (AC9S10U06)

### Cross-curriculum priorities

- ✓ Aboriginal and Torres Strait Islander Histories and Cultures
- ☐ Asia and Australia's Engagement with Asia
- ☐ Sustainability

### General capabilities

- ☐ Literacy
- ☐ Numeracy
- ✓ Digital literacy
- ✓ Critical and creative thinking
- ☐ Personal and social capability
- ☐ Ethical understanding
- ☐ Intercultural understanding


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