

ACE SCIENCE HOMEWORK TASKS WITH LEARNING LADDERS

Below is a brief introduction to the three Science Homework Task books in the series plus their contents.

It is often hard to set 'meaningful' homework tasks as it usually takes a lot of planning. These tasks have been developed to do just that: provide a range of extended homework projects from which students can get a much wider experience. We have found that many students relish the chance to 'do a project' and have a real feeling of pride with their work when they hand it in.

The key features of the ACE Science Homework Tasks:

- Extend learning outside the classroom.
- Encourage the use of science in 'real life' situations.
- Encourage independent learning.
- Encourage improvements in literacy, numeracy and ICT.
- Fit with the new 2014 KS3 Science Curriculum.
- Develop skills in working scientifically.
- Excellent preparation for Key Stage 4 assessment tasks.
- Allow parents to see not only how their children are being assessed but also the improvements in their work.

Cross-curricular opportunities

We feel that these projects could be easily adapted for such ventures and so have added some suggested links in the Teacher Notes. These tasks can be a starting point for this and we would be interested to know how people adapt and use these tasks for this part of the new Key Stage 3.

How to use these tasks

Each task is a simple open-ended task that assesses knowledge and understanding of a significant concept from the new Science National Curriculum. The tasks should be photocopied with the task sheet and the ACE Learning Ladder back-to-back or side-to-side. Teachers and learners can use the ACE Learning Ladder to guide their response to the task.

Each task is available in three level ranges: Establishing, Confident and Advanced. This allows you to differentiate appropriately.

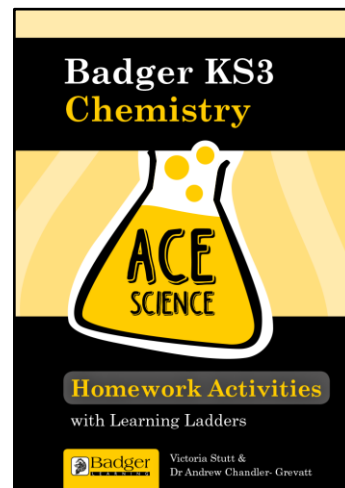
This book contains four types of task:

- Projects
- Making and Presenting
- Mini Investigations
- Critical Thinking.

General information on how to use each task is given on 'General Guide' sheets and specific information relating to each task is given in each task's 'Teacher Notes'.

ACE SCIENCE KS3 SCIENCE

HOMEWORK TASKS CHEMISTRY



CONTENTS

1 Projects

Tasks

- 1 Who made the periodic table?
- 2 Chemical care
- 3 Extracting salt
- 4 Considering ceramics, polymers and composites
- 5 Great geologists
- 6 Living scientists
- 7 Staying scientific
- 8 Profession portfolio

Topic Links

The periodic table
Chemical reactions
Pure and impure substances, Chemical reactions

Materials
Earth and atmosphere
Any
Any
Any

2 Making and Presenting

- 1 Pocket particles
- 2 Marketing metals
- 3 Acids and alkalis
- 4 Equation education
- 5 Garden geology
- 6 Science timeline
- 7 Scientific scriptwriting
- 8 Scintillating science!

The particulate nature of matter
The particulate nature of matter, The periodic table
Chemical reactions
Chemical reactions
Earth and atmosphere
Any
Any
Any

3 Mini Investigations

- 1 Caring for cress
- 2 Innovative indicators
- 3 Soil sampling
- 4 Screen scientists
- 5 My scientific investigation
- 6 My peer review

Chemical reactions
Chemical reactions
Earth and atmosphere
Any
Any
Any

4 Critical Thinking

- 1 Mercury madness
- 2 Detecting disasters
- 3 Terrible trials
- 4 Wasting water
- 5 Scientific spending
- 6 Shampoo statistics
- 7 Science on TV
- 8 Science in newspapers

Atoms, elements and compounds,
The periodic table, Materials
Earth and atmosphere
Pure and impure substances, The periodic table
Earth and atmosphere
Any
Any
Any
Any

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PROJECT 1: TEACHER NOTES

WHO MADE THE PERIODIC TABLE?

NATIONAL CURRICULUM LINKS

The topic covered will depend on the practical examples students focus on.

THE PERIODIC TABLE

- the varying physical and chemical properties of different elements
- the principles underpinning the Mendeleev periodic table
- the periodic table: periods and groups; metals and non-metals
- how patterns in reactions can be predicted with reference to the periodic table.

WORKING SCIENTIFICALLY

Scientific attitudes

Analysis and evaluation

CROSS-CURRICULAR OPPORTUNITIES INCLUDE:

- history – using sources.

TIME

Three homework sessions of between 30 and 60 minutes each.

ADDITIONAL GUIDANCE

Students will find the names of several influential scientists given on the task sheet, which will help them guide their research into who developed the periodic table.

It has been suggested that they draw a timeline to help them discuss the developments of the periodic table. Higher ability students may like to consider if any other scientists had a role in the development of the periodic table, or if there may have been scientists who haven't made it into the history books, perhaps due to bad timing with their results etc!

ASSESSMENT, FEEDBACK AND IMPROVEMENT

Assessing these tasks should not be arduous. Rather than assigning an absolute grade, you should focus on how each student can improve. To ensure that this task is formative, students should be given the opportunity to improve their work based on the teacher's targets or through peer and self-assessment.

GUIDANCE FOR CONFIDENT (C)

Students working with confidence will make a coherent and detailed timeline.

We find that reading through the project using these additional prompts helps to assess the task.

WHO MADE THE PERIODIC TABLE?

So who came up with the periodic table? And how did they decide on its layout? And what exactly can we use it for?

John Newlands Dimitri Mendeleev

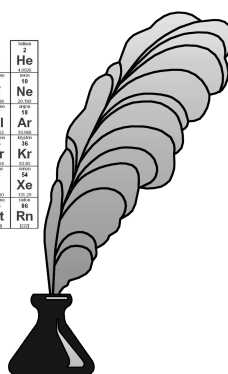
SECTION 1: RESEARCH THE DEVELOPMENT OF THE PERIODIC TABLE

- ## SECTION 2: WHY DOES THE PERIODIC TABLE LOOK THE WAY IT DOES?

- ## SECTION 3: THE FUTURE OF THE PERIODIC TABLE

- Do you think the periodic table will always look the same way?
- What changes may come about which would change the periodic table as we know it?

atomic 57	atomic 58	atomic 59	atomic 60	atomic 61	atomic 62	atomic 63	atomic 64	atomic 65	atomic 66	atomic 67	atomic 68	atomic 69	atomic 70
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb
138.905	140.12	140.908	144.24	144.913	150.36	151.964	157.25	158.925	162.500	164.930	167.259	168.930	173.054
89	90	91	92	93	94	95	96	97	98	99	100	101	102
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No



Use your own words throughout the project.

Use the Good Project Guide sheet for tips on internet safety, research and literacy.

WHO MADE THE PERIODIC TABLE?

So who came up with the periodic table? And how did they decide on its layout? And what exactly can we use it for?

Dimitri Mendeleev

SECTION 1: RESEARCH THE DEVELOPMENT OF THE PERIODIC TABLE

- Use the internet or books to find out about the scientists listed above.
- Describe the role each scientist played.
- Draw a timeline to show the developments that took place.

- Find out why the periodic table has been set out the way it has.
- What information can the periodic table give us?
- Has the periodic table always looked this way?

- Do you think the periodic table will always look the same way?
- What changes may come about which would change the periodic table as we know it?

Use the Good Project Guide sheet for tips on internet safety, research and literacy.

WHO MADE THE PERIODIC TABLE?

Chemists all around the world use the periodic table to help them in their work. It is an invaluable tool for telling chemists about every element we know about.

So who came up with the periodic table? And how did they decide on its layout? And what exactly can we use it for?

Research the following scientists to help you complete your project:

Johann Döbereiner

Stanislao Cannizzaro

John Newlands

Dimitri Mendeleev

Include other scientists you feel have played an important role, and produce a detailed timeline of the periodic table's development, discussing why scientists wanted to order the elements.

Include the following sections:

Section 1: The development of the periodic table.

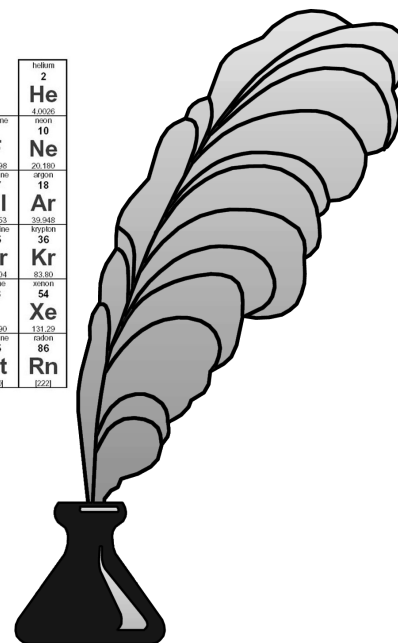
Section 2: Why does the periodic table look the way it does and what can it tell us?

Section 3: The future of the periodic table - will it always look this way?

hydrogen 1 H 1.0079																	helium 2 He 4.0026				
lithium 3 Li 6.941	beryllium 4 Be 9.0122															boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180
sodium 11 Na 22.990	magnesium 12 Mg 24.305															aluminium 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453	argon 18 Ar 39.948
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.64	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80				
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 106.91	paladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29				
cesium 55 Cs 132.91	barium 56 Ba 137.33	lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	dysprosium 66 Dy 162.50	holmium 67 Ho 164.93	erbium 68 Er 167.26	thulium 69 Tm 168.93	ytterbium 70 Yb 173.04						
francium 87 Fr [223]	radium 88 Ra [226]	actinium 89 Ac [227]	thorium 90 Th 232.04	protactinium 91 Pa 231.04	uranium 92 U 238.03	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [258]	nobelium 102 No [259]						

boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998
aluminium 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453
gallium 31 Ga 69.723	germanium 32 Ge 72.64	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904
indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90
mercury 80 Hg 200.59				
unquadium 114 Uuq [289]				

lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	dysprosium 66 Dy 162.50	holmium 67 Ho 164.93	erbium 68 Er 167.26	thulium 69 Tm 168.93	ytterbium 70 Yb 173.04
actinium 89 Ac [227]	thorium 90 Th 232.04	protactinium 91 Pa 231.04	uranium 92 U 238.03	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [258]	nobelium 102 No [259]



Use websites, magazines and books to get information to answer each section above. Use the ACE Learning Ladder to help you do your best.

Use your own words throughout the project.

Use the Good Project Guide sheet for tips on internet safety, research and literacy.

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PROJECT 1: ACE LEARNING LADDER

WHO MADE THE PERIODIC TABLE?

ACE LEARNING LADDER

Assessment Check	The types of things you can do:
Advanced	<ul style="list-style-type: none">• Make a detailed timeline, drawing on detailed scientific knowledge and understanding.• Explain why scientists were trying to find an order for the elements and how other findings may have influenced the scientists' work.• Explain, in detail, the contribution each scientist made.• Explain why the periodic table is ordered the way it is and what it can tell us, including discussions on reactivity.• Suggest some changes that could happen to the periodic table, using evidence to justify your suggestions.• Use a range of appropriate scientific words, symbols and units accurately.
Confident	<ul style="list-style-type: none">• Make a timeline, drawing on scientific knowledge and understanding.• Explain why scientists were trying to find an order for the elements.• Explain the contribution each scientist made.• Explain why the periodic table is ordered the way it is and what it can tell us.• Suggest some changes that could happen to the periodic table.• Use a range of appropriate scientific words, symbols and units.
Establishing	<ul style="list-style-type: none">• Make a simple timeline, drawing on some scientific knowledge and understanding.• State what each scientist found out.• Give a simple reason why scientists were trying to place elements in an order.• State one or two pieces of information the periodic table contains about elements.• State whether the periodic table is likely to stay the same forever, giving a reason.• Use some appropriate scientific words, symbols and units.