Covalent or Ionic? Recognising Patterns in Bonding

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COLLABORATIVE LEARNING PROJECT
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We support a network of teaching professionals to develop and disseminate accessible talk-for-learning activities in all subject areas and for all ages.
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BRIEF SUMMARY OF BASIC PRINCIPLES BEHIND OUR TEACHING ACTIVITIES:

The project is a teacher network, and a non-profit making educational trust. Our main aim is to develop and disseminate classroom tested examples of effective group strategies that promote talk across all phases and subjects. We hope they will inspire you to develop and use similar strategies in other topics and curriculum areas. We want to encourage you to change them and adapt them to your classroom and students. We run teacher workshops, swapshops and conferences throughout the European Union. The project posts online many activities in all subject areas. An online newsletter is also updated regularly.

*These activities are influenced by current thinking about the role of language in learning. They are designed to help children learn through talk and active learning in small groups. They work best in non selective classes where children in need of language or learning support are integrated. They are well suited for the development of oracy. They provide teachers opportunities for assessment of talk.

*They support differentiation by placing a high value on what children can offer to each other on a particular topic, and also give children the chance to respect each other's views and formulate shared opinions which they can disseminate to peers. By helping them to take ideas and abstract concepts, discuss, paraphrase and move them about physically, they help to develop thinking skills.

*They give children the opportunity to participate in their own words and language in their own time without pressure. Many activities can be tried out in pupils' first languages and afterwards in English. A growing number of activities are available in more than one language, not translated, but mixed, so that you may need more than one language to complete the activity.

*They encourage study skills in context, and should therefore be used with a range of appropriate information books which are preferably within reach in the classroom.

*They are generally adaptable over a wide age range because children can bring their own knowledge to an activity and refer to books at an appropriate level. The activities work like catalysts.

*All project activities were planned and developed by teachers working together, and the main reason they are disseminated is to encourage teachers to work more effectively with each other inside and outside the classroom. They have made it possible for mainstream and language and learning support teachers to share an equal role in curriculum delivery. They should be adapted to local conditions. In order to help us keep pace with curriculum changes, please send any new or revised activities back to the project, so that we can add them to our lists of materials.

Covalent or Ionic? Recognising Patterns in Bonding

These resources are ready for piloting in class and we look forward to your feedback. The principle here is the use the card sets (3 x 5 elements and compounds which have been given the power of speech and writing) to fill the blank matrix. We have provided completely blank boards (which you might want to enlarge up to A3). It is a quite difficult task to fill with a set of cards and we may also need to change some of the language on the cards when we try it out in class. We have provided boards with partial information for the first card set: one different section for each row. Pupils could construct their own set of information for other elements compounds. Any suggestions for pictures/diagrams?

Covalent or Ionic? Blank matrix

Compound or Element	What does the first element do with its electrons?	What does the second element do with its electrons?	Covalent or ionic?	Metal + Non metal? Non metal + Non-metal?

Covalent or Ionic? - Complete card set 1 with headings

Compound or Element	What does the first element do with its electrons?	What does the second element do with its electrons?	Covalent or ionic?	Metal + Non metal? Non metal + Non-metal?
Hydrogen H2	I am unstable on my own and need to share my electron with another.	I am unstable on my own and need to share my electron with another.	Covalent	nm+nm
Methane CH4	I need to bond with four hydrogen atoms to fill my outer shell and become stable.	Four of us hydrogen atoms each need an electron from carbon to become stable.	Covalent	nm+nm
Potassium Fluoride KF	I am unstable and need to give an electron away to fluorine.	I am unstable and need an electron from potassium.	Ionic	m+nm
Ammonia NH3	I need to bond with three hydrogen atoms to fill my outer shell and become stable.	Three of us hydrogen atoms each need an electron from nitrogen to become stable.	Covalent	nm+nm
Magnesium Oxide MgO	I am unstable and need to give two electrons away to oxygen.	I am unstable and need to gain two electrons from magnesium.	Ionic	m+nm

Covalent or Ionic? - Partially filled matrix for card set 1

Compound or Element	What does the first element do with its electrons?	What does the second element do with its electrons?	Covalent or ionic?	Metal + Non metal? Non metal + Non-metal?
Hydrogen H2			Covalent	
	I need to bond with four hydrogen atoms to fill my outer shell and become stable.			
Potassium Fluoride KF		I am unstable and need an electron from potassium.	Ionic	
		Three of us hydrogen atoms each need an electron from nitrogen to become stable.		
Magnesium Oxide MgO	I am unstable and need to give two electrons away to oxygen.			m+nm

Covalent or Ionic? - Card set 2

Compound or Element	What does the first element do with its electrons?	What does the second element do with its electrons?	Covalent or ionic?	Metal + Non metal? Non metal + Non-metal?
Chlorine Cl2	I am unstable on my own and need to share my electrons with another chlorine.	I am unstable on my own and need to share my electrons with another chlorine.	Covalent	nm+nm
Carbon Tetrachloride CCl4	I need to bond with four chlorine atoms to fill my outer shell and become stable	Four of us chlorine atoms each need an electron from carbon to become stable	Covalent	nm+nm
Potassium Chloride KCl	I am unstable and need to give an electron away to chlorine.	I am unstable and need an electron from potassium.	Ionic	m+nm
Water H2O	Two of us need to bond each with an oxygen atom to fill our outer shells and become stable	I need two hydrogen electrons from two hydrogen atoms to fill my outer shell and become stable.	Covalent	nm+nm
Aluminium Oxide Al2O3	I am unstable and love being with oxygen but because I need to give up three electrons to become stable there needs to be two of me and three of them.	I am unstable and each one of me needs to gain two electrons from aluminium.	Ionic	m+nm

Covalent or Ionic? - Card set 3

Compound or Element	What does the first element do with its electrons?	What does the second element do with its electrons?	Covalent or ionic?	Metal + Non metal? Non metal + Non-metal?
Oxygen O2	I am unstable on my own and need to share my electrons with another oxygen.	I am unstable on my own and need to share my electrons with another oxygen.	Covalent	nm+nm
Carbon Dioxide CO2	I need to bond with two oxygen atoms to fill my outer shell and become stable	Two of us oxygen atoms each need two electrons from carbon to become stable	Covalent	nm+nm
Sodium Fluoride NaF	I am unstable and need to give an electron away to fluorine.	I am unstable and need an electron from sodium	Ionic	m+nm
Hydrochloric Acid HCl	I am unstable and need to bond by sharing an electron with chlorine to become stable.	I am unstable and need to bond by sharing an electron with hydrogen.	Covalent	nm+nm
Lithium Fluoride LiF	I am unstable and need to give an electron to fluorine. Now I'm stable.	I am unstable and need an electron from lithium	Ionic	m+nm