

## Activity 10: Linking science to the everyday world

**In this activity students are invited to use their imagination and understanding of science topics to create novel analogies for scientific concepts**

***'friends are like acid because when you mix them with alcohol you get base'***

*(An ASCEND delegate makes a clever, but technically inaccurate analogy)*

### Overview of learning activity

'The analogy game' is a card game based upon finding analogies between scientific concepts and everyday activities. The game is suitable for groups of students, possibly group sizes of 5-6 (or even larger) depending upon the group dynamics. Students are 'dealt' blue 'concept cards' and green 'analog' cards, and must use their concept cards to form analogies that the other players find convincing. The first player to have successfully formed analogies for all their concept cards wins. The rules provided are:

The dealer holds two packs of cards, one blue pack, one green pack.. Each player is dealt five (5) concept (blue) cards and seven (7) analog (green) cards.
The aim of the game (*) is to be the first player to have no blue concept cards left. (* well – the true aim of the game is to think creatively, and perhaps have fun, rather than to 'win'...)
Each player plays in turn, and turns move around the group starting with the dealer.
A player can put down a concept card by making an analogy. To make an analogy the player has to place on the table a blue concept card, and a green analog card, and state that: "the [concept] is like the [analog] because..."
(The player is allowed to change plurals to singular, and vice versa, and to use 'the', 'a', 'an', etc.)
If a player has a blank analog card, then they can label it with their own suggested analog.
The other players must accept the analogy if there is some similarity (which the player making the analogy can explain) – but can reject an analogy that is not explained.
When a player puts down an analogy (concept card and analog card), she picks up one more green analog card.
If a player cannot make an analogy on their turn, they may swap either two (2) blue concept cards, or three (3) green analog cards with (unseen) cards from the packs. They then have to wait their next turn before trying to make an analogy.

**Table 1:** Default rules for the analogy game

## Rationale for the activity

'The analogy game' was used in ASCEND as a 'fun' activity. Students were invited to play the game over refreshments during the registration period before the final ASCEND session. (ASCEND involved students from several schools coming into the University Faculty of Education, and there was a conference-style registration process, with refreshments available from the Faculty café – see Chapter 6.) However, the game was designed with serious purposes. One of these involved introducing the notion of analogy as a tool used in science. Scientists use analogies a good deal to make sense of phenomena – either making analogies with existing scientific ideas, or (as in the game) with more everyday phenomena. Although analogies of this type do not assure an understanding of new areas of science, they have certainly provided scientists with fertile starting points for exploring new explanations and understandings. Analogies provide familiar models to test, critique, extend or dismiss.

A parallel purpose of the game is to provide an opportunity for students to demonstrate their creativity. The rules are set up so that a valid analogy is one that can be explained, not necessarily one that other players would feel is a strong analogy: the challenge is to find a connection or parallel that can be used to justify the analogy. (This adds to fun element by providing the opportunity for obscure and idiosyncratic suggestions.) The most gifted science learners may be those who are able to make connections and see links that others do not notice: the analogy game provides an outlet for divergent, creative thinking.

**B1: here we go here we go . . . a bible . . . is like a molecule . . . both contain (lots of ) information**

**B2: how does a molecule contain information?**

**B1: . . . molecules contain loads of atoms . . . proven!**

**B2: I've got a good one I've got a good one . . . for that**

**B1: yeah, go on then . . .**

**B2: A molecule is a complex arrangement of atoms and a bible is a complex arrangement of stories . . . and books and things . . .**

*(ASCEND delegates develop an analogy)*

The set of analog cards includes some blanks (and teachers may wish to consider increasing the proportion of blanks) to act as 'wild cards': a player with a blank analog card may write in their own suggested analog for a science content, thus making the task even more open ended. The default rules set out such parameters as how many cards of each type are dealt to each player, and when and how cards may be swapped. It is suggested that any attempts by players to improve the running of the game by modifying the rules should be encouraged, as long as such changes are made by consensus within the playing group. Again, the most gifted learners may well wish to modify and improve the rules rather than just accept a game as 'given'.

The concepts included in the set are drawn from across science topics (see Box 1). Teachers may readily add additional concepts.

acceleration, acid, adrenalin, alkali, atom, bacteria, blood, boiling, brain, carbohydrate, cell, chemical reaction, chlorophyll, chloroplast, combustion, condensing, covalent bond, distillation, DNA, electric current, energy, enzyme, evaporation, excretion, eye, fat, fission, force, fungus, gametes, gene, germination, growth, heart, heat, hydrogen, insulin, ionic bond, leaf, light, lung, magnet, mammal, melting, menstruation, metal, molecule, muscle, neon, nerve, neuron, neutralisation, nucleus, oestrogen, oxidation, oxygen, photosynthesis, pollination, primate, puberty, radioactivity, reduction, reproduction, respiration, rusting, sodium, sodium chloride, solution, temperature, testosterone, velocity, virus

**Box 1:** concepts named on science concepts cards

The analogs are just a wide range of 'everyday' activities, events and people (see Box 2). Some reflect contemporary interests at the time of preparing the cards, and teachers may wish to amend the set to reflect local issues or events in the news etc.

abuse, acne, Africa, agent, aging, agitator, ant, apple, aqualung, Archbishop, Arsenal, art, arthritis, average, babe, bananas, bank, beauty, Beckham, being popular, bending, bible, bicycle, boot sale, boredom, boredom, bread vans, breaking up, breaking-into a twenty, breathing, brick, brick wall, building-up credit, bully, buying Euros, cage, camouflage, car exhaust, cauliflower, charity, cheating, Chelsea, cheque, clone, clothes, cockerel, code, cola, compact disc, control centre, conversation, conversation, Coronation Street, courier, credit, dairy, dancing, death, debt, defrosting the 'fridge, detention, diamonds, dirt, divorce, Dr Who, dreaming, drowning, earth, East Enders, editing, empire building, English breakfast, envy, exercise, explosion, factory, fading away, failure, falling in love, fashion, food, footballer's wife, fridge door, friends, fruit, fuming, gang, garden, goggles, going to college, good idea, greed, grey hair, heaven, hell, hemisphere, hiding, high heels, holidays, homework, houses, hydrogen balloon, ink, internet, intuition, Jamelia, J-Lo, joke, jumping, kernal, key, killjoy, kilt, kind granny, kissing, learning, loan, lock, love, lust, magic trick, marriage, money, motorway service station, moving house, music, netball, nuclear war, Ozzy, painting the Fourth bridge, pantry, parasol, pay rise, PE teacher, peaches, petrol, photocopying, picture book, plastic, pockets-with-holes, poodle, postman, primary school, pump, Radio Times, railway, rate of pay, ratio, river, roads, rules, running, Russian roulette, sandals, sanding-down, school, school outing, shampoo, sharing, sigh, silk, sky, smile, smith, spiral stairs, sponge, spring clean, stretching, string, sugary food, Sunday, Sussex, swimming, telephone, terrorist, Tesco, the Queen, tree, TV presenter, vault, Versace, visionary, waking up, Wales, walnut, wealth, web, Weekend, wit, X ray vision

**Box 2:** potential analogs for scientific concepts provided on analog cards

## Resources

The following resources are included on the CD:

Resource	Description	Filename
Analogy game rules	Default rules for playing the analogy game.	Act 10 game
Green analog cards	A set of pages to be printed as cards * on green paper (includes 'blank' cards), <sup>β</sup>	Act 10 analogs
Blue concept cards	A set of pages to be printed as cards * on blue paper	Act 10 concepts

\* e.g. to be printed as 12 (or so) file pages per A4 page for cutting into sets of cards.