

**Rain  
Reaction**  
By Craig Christie



***SCIENCE WEEK 2011***  
***INTERNATIONAL YEAR OF***  
***CHEMISTRY***

RAIN REACTION IS BROUGHT TO YOU BY  
NATIONAL SCIENCE WEEK  
[www.scienceweek.gov.au](http://www.scienceweek.gov.au)

**Teacher Activity Pack**

**Contents:**

- About the Company
- Teacher instructions
- Selection of activities suitable for either before or after the performance
- *RAIN REACTION* crossword

**PERFORM! EDUCATIONAL MUSICALS**  
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## **ABOUT THE COMPANY**

*Perform! Educational Musicals* is a multi award-winning theatrical producer and one of the largest touring theatre companies throughout Australia and New Zealand.

The company specialises in touring educational musicals for schools and has been operating in Australia for over ten years. In that time we have toured to over 150,000 students annually in schools across five states. In all, the company and its writers have toured our specialty educational musicals to **over one million students** across several countries including Australia, New Zealand, Singapore, the United Kingdom, the United States of America and Papua New Guinea.

In Australia we tour an annual **Science Week** musical celebrating the National Science Week Schools Theme. These productions promote the theme and curriculum by inspiring students with the limitless fun and possibilities offered by science both in their everyday life and as a future career.

The performances, which take place within schools, are **highly interactive** for the students and feature action-packed narratives, appealing, and identifiable characters, loads of **comedy** and irresistible **songs** that captivate and engage all audiences from ages 10 to 15 years (as well as their teachers). Question time at the conclusion of the performance reinforces the learning outcomes, and this specially designed Teacher Activity Pack sent prior to the performance offers a comprehensive selection of classroom exercises for both before and after the show.

**The Writer/Composer** – Craig Christie

[www.craigchristie.com](http://www.craigchristie.com)

Craig Christie is an award-winning writer, composer and qualified teacher. His unique educational musicals have played to over one million students throughout New Zealand, Australia, UK, USA and Asia. As a composer Craig has also created a number of commercial musicals including *Eurobeat – Almost Eurovision* which opened on the London West End in 2008. He also travels extensively around the world to lecture and run workshops in drama in education, community theatre and creative writing.

To find out more about *Perform! Educational Musicals* or to contact the company, please log onto our website at [www.performmusicals.com](http://www.performmusicals.com)



## **TEACHER INSTRUCTIONS**

- **TEACHER ACTIVITY PACK:** Please copy and distribute to all relevant teachers **PRIOR** to the performance.
- **PERFORMER ARRIVAL TIME** Performers will arrive approximately 30 minutes before the scheduled performance start time.
- **STUDENT NUMBERS:** Please know **IN ADVANCE** the number of students attending and inform our Team Leader at the conclusion of the performance.
- **START TIME:** Please ensure students are lined up outside the performance space 5 minutes before the commencement of the show to guarantee a prompt start. We are not able to work within your school bell times if the performance does not start on time.
- **PERFORMANCE SPACE REQUIREMENTS:** Power access is required in the space to power our sound equipment.  
*Please note:* a small or medium sized room such as a multipurpose room or small hall is more effective acoustically and atmospherically than a large space such as a gym. Please make the performance area available 30 minutes prior to the commencement of the show so that the performers can prepare the space.
- **SAFETY:** Please ensure the space is clean and clear for the safety and wellbeing of your students and the performers.
- **TEACHER PRESENCE:** We request teacher presence and support for the performers at all times during the show.
- **PRICE:** \$5.00 (+GST) per student (Your school may have already paid a deposit which will be deducted off the final invoice).
- **MINIMUM NUMBER OF STUDENTS:** 140 students are required per show otherwise a flat fee of \$700 (+GST) will apply per performance.
- **PAYMENT OF BALANCE:** A tax invoice for the balance will be forwarded to you the day *after* the performance, so please **do not prepare a cheque on the day.** We have instructed the performers not to handle any money or financial issues. These should all be directed to our office.



## **TEACHER INFORMATION AND ACTIVITIES**

1. ***Rain Reaction!* synopsis and themes**
2. **General discussion and comprehension questions**
3. **Student group activities**
4. **Glossary of terms used in the production**
5. **Related web sites and further activities**

## **SYNOPSIS and THEMES**

The basic premise of *Rain Reaction* is that the greatest problem facing the planet today is people's apathy and selfishness in regard to being proactive towards improving the world's environmental issues. Everyone knows that something must be done however relatively few people appear to be actually prepared to take any significant action and many want someone else to take responsibility.

*Rain Reaction* details how CHEMISTRY is a creative science and explores how it is involved in solutions to sustainable living, clean water, manufactured products and climate change.

In *Rain Reaction* this is represented by Wozza who is unwilling to acknowledge or be accountable for his actions and instead is obsessed with escapist notions of fame via reality television. Partly due to a sense of helplessness, Wozza resists any attempts to divert him from his mission of celebrity. Enter Ashley Kutcher who with the aide of the student audience play an ongoing 'prank' on Wozza. In leading him through his attempts at being a reality TV star, Ashley is in fact setting up Wozza in order to showcase how CHEMISTRY is at the core of all he holds dear. In the end Wozza comes to the realisation of what has occurred and understands how much CHEMISTRY impacts the world in which we all live.

The character of Ashley is a female version of 'Ashton Kutcher' whose function in the production is to expose Wozza to the world of CHEMISTRY and how it is at the forefront of not just identifying the reasons for many world issues but actually finding real and practical solutions.

The character of Wozza is very likeable but lives within his own ignorance of his impacts on the world we live in. He is being pranked by Ashley because he has no real respect for the Earth and its resources. He thinks Science is irrelevant to leading the life he wants to live. As long as he has his Wii, his plasma TV, a full fridge and a comfortable home he's happy and able to follow his dream – to appear on prime time TV. However through the series of pranks he comes to understand that CHEMISTRY provides us with the answers to live the way we want but in a balanced way.



Post show question along with this Activity Pack are designed to extend these themes by then encouraging students to investigate and take real action within their own lives, families and community.

### **COMPREHESION QUESTIONS**

1. Create a character profile on Wozza and Ashley. What characteristics define each of them?
2. What is Wozza's attitude to environmental issues and the people who bring them to his attention? What is his understanding of the role of Chemistry in how the world operates.
3. List the reality shows that are lampooned in Rain Reaction
4. What ideas does the section on X Factor directly explore?
5. Survivor?
6. Spicks and Specks?
7. Masterchef?
8. Who Wants To Be A Millionaire?
9. Why do you think Wozza is so resistant to all the things that Ashley is determined to bring to his attention?
10. What things do you think Ashley may have done to have been more successful in getting Wozza to listen to what she has to say and to taking some action?
11. Wozza comes to a new realisation by the end of the show about the significance of Chemistry to the world. What is it?
12. Which of the ideas presented in the show had the most impact on you and why?
13. Imagine if you could produce any one of the shows referred to in Rain Reaction. How would you change the show so that it might have more meaningful themes and content?



14. The final question in the 'Who Wants To Be A Millionaire' section presents four options as the greatest obstacles to the world's population acting upon reducing carbon emissions? What were they? Can you think of any other things that may be significant obstacles as well as the four mentioned?
15. What are the areas of day to day life that are shown to involve chemistry that you hadn't actually thought of before? Can you think of other things that chemistry is involved in that hadn't really occurred to you before?

## **STUDENT ACTIVITIES**

### **CHEMISTRY ON THE MOVE**

A really clear example of how chemistry is involved in almost every aspect of our lives can be seen on the website for Royal Australian Chemical Institute – RACI  
<http://www.raci.org.au>

Click onto the Chemistry News section and see the vast array of activities and endeavors across the planet that Chemistry is directly involved in.

Organize members of the class to take one of the topics in the 'news' section and report on it. Every day there can be a 'Chemistry update' report telling the rest of the class about the particular topic

### **CHEMIST OF THE WEEK**

There is so much information available about chemists that can be found on sites such as  
<http://chemistry.about.com/od/historyofchemistry/a/famouschemists.html>  
<http://www.liv.ac.uk/chemistry/links/refbiog.html>  
<http://www.buzzle.com/articles/famous-chemists.html>

Have students research and present to the class the biographies and achievements of a particular chemist who captures their imagination. Perhaps a good place to start would be celebrating the awarding of her Nobel Prize for Chemistry in 2011 by presenting the biography of Marie Curie.

### **ONE PERSON**

We all know it but how much are we doing about it. Create an action list on what you as an individual can or should do to lessen your carbon footprint. Over a period of weeks see if you can actually make the necessary changes in your lifestyle. What things are easy to achieve? What things are more challenging? Why?



Compare outcomes with the rest of the class and see what changes the entire class can implement over a period of a few weeks. Form support groups for the things that people are finding more difficult to implement e.g. The support group for taking shorter showers, the support group for not getting a lift if it's not absolutely necessary, the support group for turning appliances off at the wall.

See if you can do the same for your household and see what results can be achieved over a four week period. The challenges you are dealing with are the ones common to many, so look at creating a campaign that directly addresses these challenges. Remember every light not left burning in an empty room, every walk instead of drive, every bit of recycling DOES make an impact. An ocean is made up of individual drops.

### THE HEART OF THE MATTER

The basic premise of *Rain Reaction* is how the field of Chemistry is providing practical solutions to many of the problems that the planet currently is dealing with. Despite people's apathy and selfishness when it comes to doing anything proactive about making an impact on all the environmental problems that beset the planet, applying some of modern Chemistry's discoveries is showing a way forward. Everyone knows that something must be done. Few people are actually prepared to do anything about it or want someone else to take responsibility. Campaigners are active on many fronts to try and shake people out of their apathy.

A panel in the UK set about creating a 'to – do' list. Here is their top 20  
(The top fifty can be found at  
<http://image.guardian.co.uk/sys-files/Environment/documents/2007/10/31/50top.pdf>)

- 1 Dramatically improve the energy efficiency of electrical goods
- 2 Religious leaders to make the environment a priority for their followers
- 3 Encourage the widespread use of solar power throughout the world
- 4 Secure a meaningful post-Kyoto treaty on reducing the emissions that contribute to global warming
- 5 Encourage households to generate much more of their own power
- 6 Introduce tax incentives to "buy green"
- 7 Tackle the rapid growth in aviation emissions
- 8 Wean ourselves off dependency on petroleum
- 9 Encourage individuals to buy less non-essential "stuff "
- 10 Dramatically improve public transport
- 11 Aim for a "zero waste" culture
- 12 Install "smart energy" meters in all homes
- 13 Introduce a measure of economic success that includes the environment



- 14 Fully harness the country's huge potential for generating renewable energy
- 15 Seek alternative, less damaging sources for biofuels
- 16 Bury carbon dioxide from power stations underground
- 17 Encourage hydrogen fuel cell technology in cars
- 18 Implement government policies to control global population growth
- 19 Reach international agreement on preserving rainforests
- 20 Create better incentives to improve energy efficiency in the home

As a group or individual activity, see which of these initiatives can be advanced by the application of Chemistry in its many forms and fields.

### **GLOSSARY OF TERMS USED IN THE PRODUCTION**

**Chemistry** - the branch of physical science concerned with the composition, properties, and reactions of substances

**Lycra** - plastic, segmented, polyurethane fibre used in making a snapback fabric, stronger and lighter than rubber.

**Carbon Dioxide** - A colourless, odourless, incombustible gas, CO<sub>2</sub>, formed during respiration, combustion, and organic decomposition and used in food refrigeration, carbonated beverages, inert atmospheres, fire extinguishers, and aerosols

**Carbon Neutral** - Carbon neutral is a term used to describe fuels that neither contribute to nor reduce the amount of carbon (measured in the release of carbon dioxide) into the atmosphere.

**Polonium** - a very rare radioactive element that occurs in trace amounts in uranium

**Radium** - a highly radioactive luminescent white element of the alkaline earth group of metals. It occurs in pitchblende, carnotite, and other uranium ores, and is used in radiotherapy and in luminous paints.

**Ozone Layer** – the region of the stratosphere with the highest concentration of ozone molecules, which by absorbing high-energy solar ultraviolet radiation protects organisms on earth.

**CFC** - a fluorocarbon with chlorine; formerly used as a refrigerant and as a propellant in aerosol cans; the chlorine in CFCs causes depletion of atmospheric ozone

**Renewable Energy** - energy derived from sources such as sun, wind, tides or waves that do not use up natural resources or harm the environment



**Carbon Offsetting** – the reduction in emissions of carbon or greenhouse gases made in order to compensate for or to offset an emission made elsewhere

**Greenhouse Emission** – is the release of a gas in an atmosphere that absorbs and emits radiation. It is the fundamental cause of the greenhouse effect.

**Ethanol** - An alcohol obtained from the fermentation of sugars and starches or by chemical synthesis. It is the intoxicating ingredient of alcoholic beverages, and is also used as a solvent, in explosives, and as an additive to or replacement for petroleum-based fuels.

**Polymer** - The simplest definition of a polymer is something made of many units. The units or “monomers” are small molecules that usually contain ten or less atoms in a row. The polymer acts as a chain in which the monomers are linked (polymerized) together to make a chain with at least 1000 atoms in a row.

### **USEFUL WEBLINKS & FURTHER ACTIVITIES**

International Year of Chemistry

<http://www.chemistry2011.org/>

<http://iyc2011.org.au/>

Australian Conservation Foundation

<http://www.acfonline.org.au/default.asp>

Online Article: Chemistry and the Environment – Help or Hindrance?

[http://www.xplora.org/ww/en/pub/xperimania/news/world\\_of\\_materials/chemistry\\_and\\_the\\_environment.htm](http://www.xplora.org/ww/en/pub/xperimania/news/world_of_materials/chemistry_and_the_environment.htm)

Royal Australian Chemical Institute

<http://www.raci.org.au/>

CSIRO Website – Science and The Environment

<http://www.csiro.au/science/Environment.html>

News, Information and Resources on Environmental Chemistry

<http://environmentalchemistry.com/>

Australian Government – Department of Climate Change and Energy Efficiency

<http://www.climatechange.gov.au/>

Australian Government – Department of Sustainability, Environment, Water, Population and Communities

<http://www.environment.gov.au/>

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Australia and the Montreal Protocol

<http://www.environment.gov.au/atmosphere/ozone/legislation/montp.html>

Info Sheet on Food and Flavour Chemists

<http://goo.gl/4lE1X>

Climate Change Australia

<http://www.climatechange.com.au/>

If any of your students would like to write to us or find out more details about our company please visit:

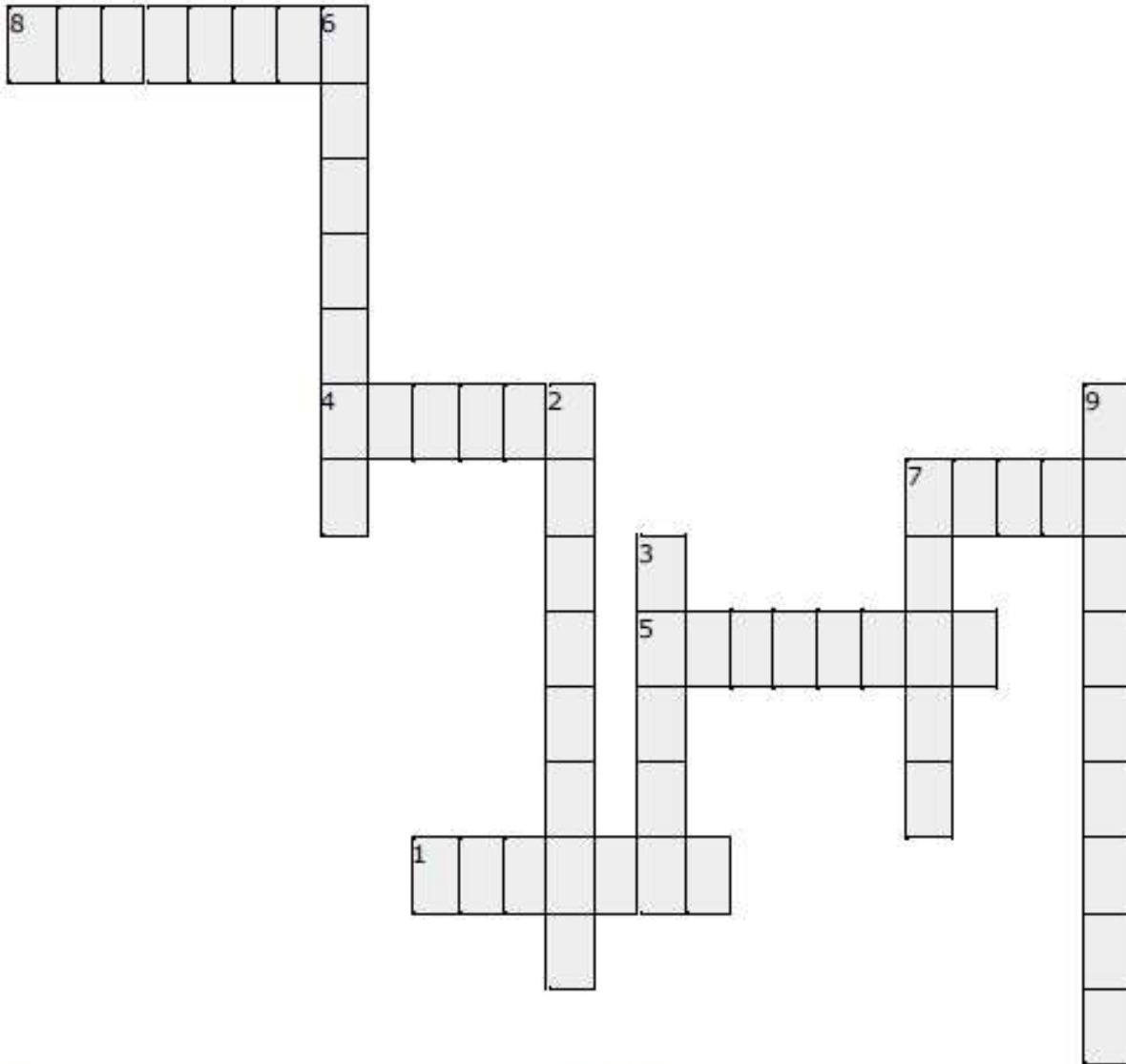
*Perform! Educational Musicals*      [www.performmusicals.com](http://www.performmusicals.com)

And for more information about National Science Week, please visit:

[www.scienceweek.info.au](http://www.scienceweek.info.au)

## Rain Reaction! Crossword

Using the information provided Rain Reaction, complete the crossword below.



### Across:

1. Water \_\_\_ as it freezes.
4. Marie Curie discovered the radioactive elements of polonium and \_\_\_
5. A chemical change usually cannot be \_\_\_
7. How many ozone atoms are in an ozone molecule?
8. Chemists are developing ways of replacing fossil fuels with \_\_\_

### Down:

2. The 1987 agreement signed by nations to halve CFC emissions by 2000 is known as the \_\_\_ Protocol
3. One of the greatest obstacles to acting upon reducing carbon emissions?
6. Surname of the man who invented Lycra
7. If a company is producing carbon emissions they can offset it by planting more \_\_\_
9. The name of the main constituent of wood, also used to replace artificial polymers like plastic

