perform! education

GLOBAL GAMBLE

TEACHER RESOURCE PACK
SCIENCE IN SCHOOLS 2019

CONTENTS

TEACHER INSTRUCTIONS

BEFORE THE PERFORMANCE:

TEACHER RESOURCE PACK: Please copy or email and distribute this pack to all relevant teachers PRIOR to the performance.

STUDENT NUMBERS: Please prepare IN ADVANCE the number of students attending so you can inform our Team Leader at the conclusion of the performance.

ON THE DAY OF THE PERFORMANCE:

SAFETY: Please ensure the space is clean and clear for the safety and wellbeing of both your students and the performers.

TABLE REQUEST: The performance will require one table of medium size. Please pre-set a table in the performance space at least 40 minutes before the scheduled performance start time.

PERFORMER ARRIVAL TIME: Performers will arrive approximately 30 minutes before the scheduled performance start time. Please make sure the space is clear and ready to ensure we can setup and start on time.

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 cannot start on time.

PERFORMANCE SPACE REQUIREMENTS: Access to power is required in the room so we can operate and sound and visuals for the presentation.
The performers require an area of approx. 5m x 5m for the staging area. Students should be seated in front of this stage area and can be on seats or sitting on the floor as long as good view of the performers.

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 at least 30 minutes prior to the commencement of the show so that the performers can prepare the space to start on time.

TEACHER PRESENCE: We request teacher presence and support for the performers at all times during the performance.

AFTER THE PERFORMANCE:

STUDENT NUMBERS: Please provide the total number of students that have attended to our Team Leader before they depart your school.

EVALUATION: Go to **performteachers.com** and click on the name of this program to evaluate and be in the draw to WIN $200

CLASSROOM ACTIVITIES: Share any of the classroom activities in this pack and use in your follow up lessons.

RESERVE A DATE FOR NEXT YEAR: Find details for next year's programs at the end of this pack and reserve a date NOW to grab the **early bird specials!**

MANY THANKS FOR YOUR ASSISTANCE AND SUPPORT!

PAYMENT: A tax invoice for the balance of payment will be forwarded to your school the day ***after*** the incursion, so please **do not prepare a cheque on the day**. We have instructed our performers not to handle any money or financial issues. These should all be directed to our office. Please refer to your Booking Confirmation for details on pricing terms and conditions. If you require another copy then call our office on 0800 775 770

ABOUT THE COMPANY

Perform! Education is a multi award-winning educational production company and part of the largest educational producers operating across New Zealand, Australia, the USA and UK.

The company specialises in touring curriculum aligned, educational musicals and sketch comedies into schools and has been operating in New Zealand for twelve years. Every year we tour to over 250,000 students and in all, the company and its writers have toured our specialty educational programs to **over three million students** across the world.

In New Zealand, we tour an annual **Science & STEM** sketch based performance as well as **Book Week** educational musicals. The annual Science presentations inspire students with the limitless fun and possibilities offered by science both in their everyday life and also from the perspective of future career pathways.

The performances, which take place within schools, are **highly interactive** and feature action-packed skits with relatable and identifiable characters, loads of **comedy** and student participation that captivate and engage all audiences across the upper primary and intermediate age ranges (as well as their teachers!).

Question/Discussion time at the conclusion of the performance reinforces the learning outcomes, and this specially designed **Teacher Resource Pack** sent prior to the performance offers a comprehensive selection of classroom exercises for both before and after the in-school performance

To find out more about ***Perform! Education*** or to contact the company, please log onto our website at www.performeducation.com

If you or any of your students would like to find out more details about our company please visit our website: **www.performeducation.com**

ABOUT THE PROGRAM

A fun filled non-stop educational performance featuring three hilarious skits that will have students participating, laughing, learning and discussing what effects **our actions today** will have on **our Future Earth tomorrow**.

Global Gamble – A Climate-Change Comedy is a live in-school educational theatre presentation focusing on natural resources and how our use of them for energy contributes to global climate change.

Action packed sketches, appealing characters, comedy, high energy and audience interaction explore these four key educational questions:

- **How is energy efficiency related to resources?**
- **What are natural resources?**
- **What is global climate change?**
- **How can we use energy wisely?**

Each skit involves audience participation in searching for the solutions to these questions. The performance will be followed by a discussion where the students can ask questions, opening up further inquiry that can be taken back to the classroom.

Student interaction is encouraged throughout the entire performance with a tool we call the **Idea Bucket**. Prior to the start of the performance the two actors will meet and talk with the students as they take their seats, asking them questions and encouraging them to write their ideas on small pieces of paper. These ideas go into the Idea Bucket, and throughout the performance, at random times, the actors select and incorporate these ideas into the structure of the story. This theatrical tool encourages students to engage and interact with the content of the performance. They wait in anticipation for their idea to come out of the Idea Bucket, hoping theirs might be next!

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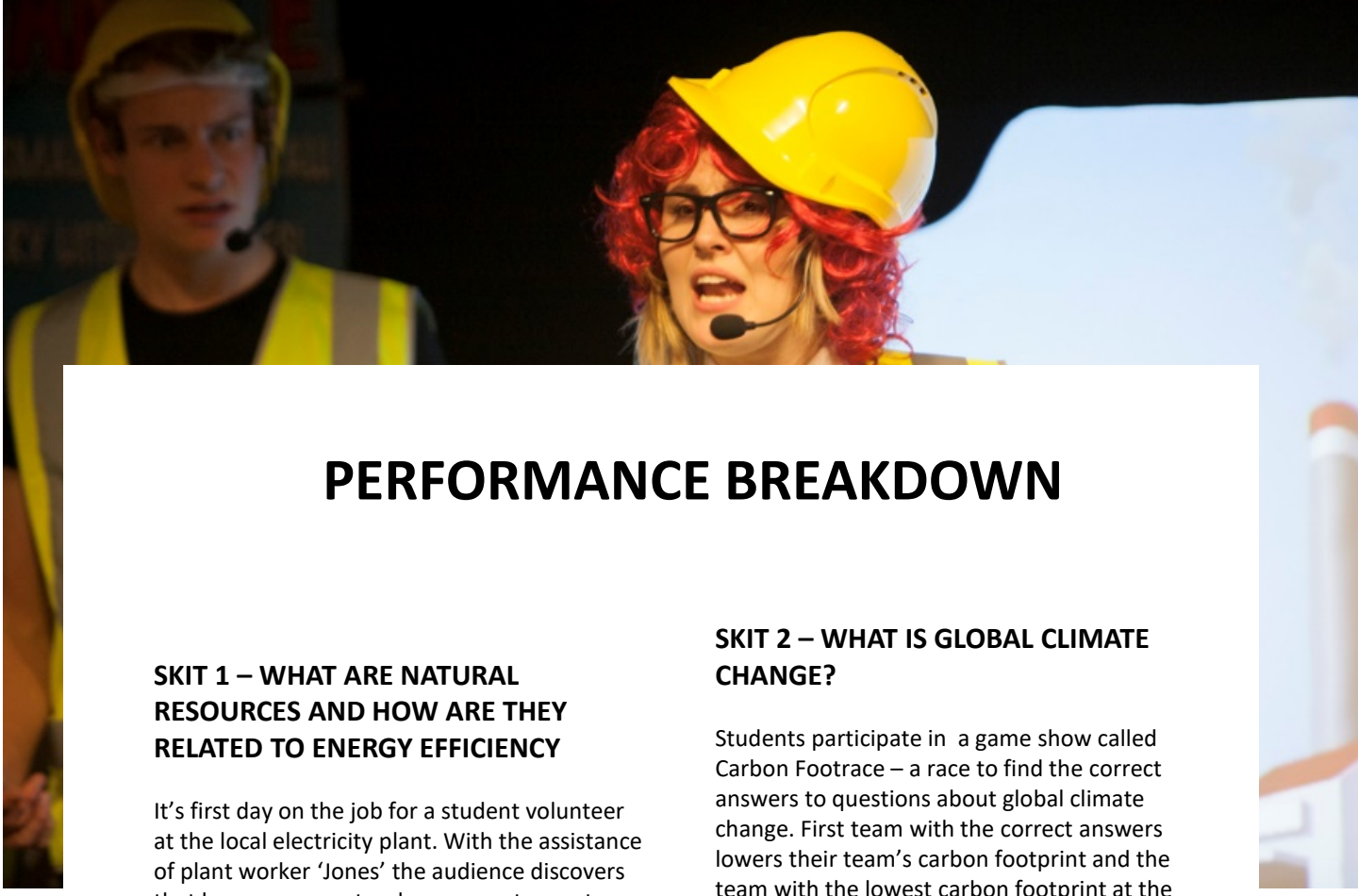


PERFORMANCE BREAKDOWN

SKIT 1 – WHAT ARE NATURAL RESOURCES AND HOW ARE THEY RELATED TO ENERGY EFFICIENCY

It's first day on the job for a student volunteer at the local electricity plant. With the assistance of plant worker 'Jones' the audience discovers that humans use natural resources to create energy for their everyday needs. The Boss of the plant prefers to make energy by burning non-renewable resources like coal, oil and natural gas. When his stock of coal runs low, he points out the link between the energy people use and the resources it takes to make them. Our valiant student volunteer steps in to help The Boss understand that, not only does burning fossil fuels for energy have significant environmental consequences, but renewable resources such as hydro, geothermal, solar and wind are effective, plentiful and environmentally friendly energy alternatives.

SKIT 2 – WHAT IS GLOBAL CLIMATE CHANGE?

Students participate in a game show called Carbon Footrace – a race to find the correct answers to questions about global climate change. First team with the correct answers lowers their team's carbon footprint and the team with the lowest carbon footprint at the end wins the game. Sound easy? Well there's a hitch. This is a 3 legged race…

SKIT 3 – HOW CAN WE USE ENERGY WISELY?

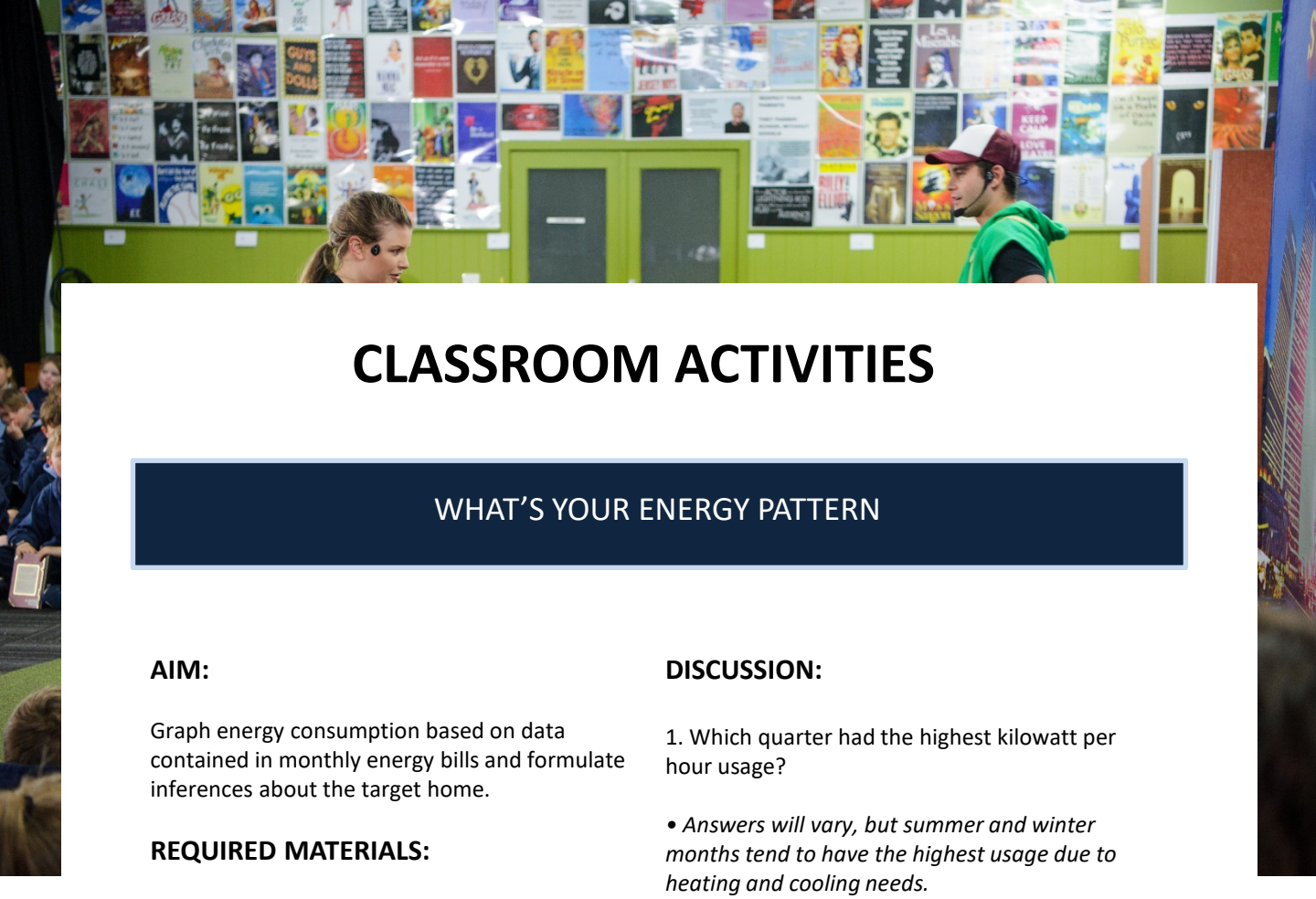
This sketch takes a comical look at a day in the life of a student volunteer and some easy, everyday ways we can all use less energy and do our bit to help slow climate change. Recycling, turning off lights and appliances, eating less meat, walking or riding to school, swapping disposable plastics for reusable containers and using LED lightbulbs are all strategies our student volunteer shares with the audience.

DISCUSSION TIME

Here the actors will recap the major points in the performance and quiz the audience on information touched upon in the production. It's also an opportunity, if time permits, for students to ask questions of the actors and open up discussion to be taken back to the classroom. The post show question time, in conjunction with this Resource Pack, is designed to reinforce and extend the learning, encouraging students to find personal relevance and investigate further.

POST SHOW DISCUSSION POINTS

- What are natural resources?
- Why are natural resources important? What do they enable?
- How do the energy related activities of our daily lives impact our environment?
- What is the Greenhouse Effect and what is the main human created greenhouse gas?
- What is a carbon footprint?
- How can you help around your house to reduce your carbon footprint?
- What effect will the warming of earth's atmosphere have on the planet? Consider the earth as well as the oceans.
- Name something you did today that helped the health of our planet.
- Besides fossil fuels, what would your car of the future run on?
- What does energy security refer to? What does it mean for you?



CLASSROOM ACTIVITIES

WHAT'S YOUR ENERGY PATTERN

AIM:

Graph energy consumption based on data contained in monthly energy bills and formulate inferences about the target home.

REQUIRED MATERIALS:

- 12-month supply of utility bills

ACTIVITY DIRECTIONS:

Ask students to work with their parents at home. Student and parent should gather one year's worth of utility bills along with some graph paper. Have the student graph the kilowatt hours used for each quarter of the year and bring the completed graphs back to the classroom.

After the graphs have been completed, analyze and discuss the range (highs and lows). It is likely that some students will have prepared bar graphs and others line graphs. Have students display their graphs and discuss their reasons for choosing a particular type of graph. Perhaps a consensus can be reached about which graph most clearly illustrates the trends in energy consumption.

DISCUSSION:

1. Which quarter had the highest kilowatt per hour usage?

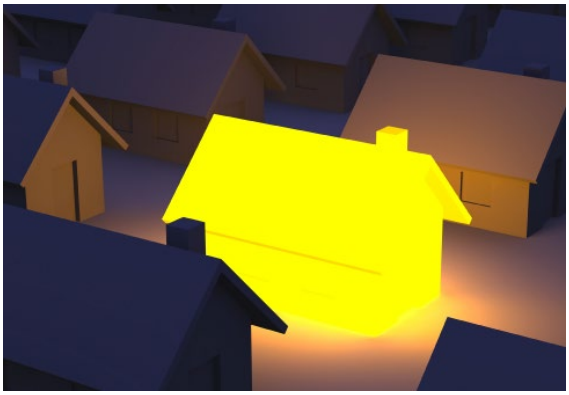
• *Answers will vary, but summer and winter months tend to have the highest usage due to heating and cooling needs.*

2. Do you think this home has air conditioning?

• *By focusing on the summer months, the students can observe whether or not the kilowatt per hour usage increases or decreases.*

3. Why might some households use more energy overall than others?

Consider number of occupants, lifestyle, appliance usage.



CALCULATE YOUR CARBON FOOTPRINT

A **carbon footprint** Is a measure of your total greenhouse gas emissions.

A carbon footprint is measured in tonnes of carbon dioxide equivalent (tCO2e). The carbon dioxide equivalent (CO2e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of carbon dioxide.

A carbon footprint considers all six of the Kyoto Protocol greenhouse gases: Carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF6).

By learning how to reduce your own carbon footprint, you can do your part toward lowering the amount of greenhouse gas released into the atmosphere.

Use the internet and the ***Global Footprint Network*** to see how your carbon footprint matches up against your classmates'.

Go to:
http://www.footprintcalculator.org/signup

DISCUSSION

- Compare results
- What factors appear to influence higher or lower emission results?
- Can you see areas in which you can make different choices to reduce your carbon footprint?
- Can you see opportunities as a class or as a school to reduce your emissions?

THE GREENHOUSE EFFECT

See if you can recreate the Greenhouse Effect and get a glimpse of a possible Future Earth.

AIM:

To prove that a transparent or semitransparent covering traps heat, just as gases in the atmosphere trap heat like a greenhouse.

REQUIRED MATERIALS

- One empty plastic soft drink bottle (two-litre size) with a cap
- A nail
- Two glass thermometers

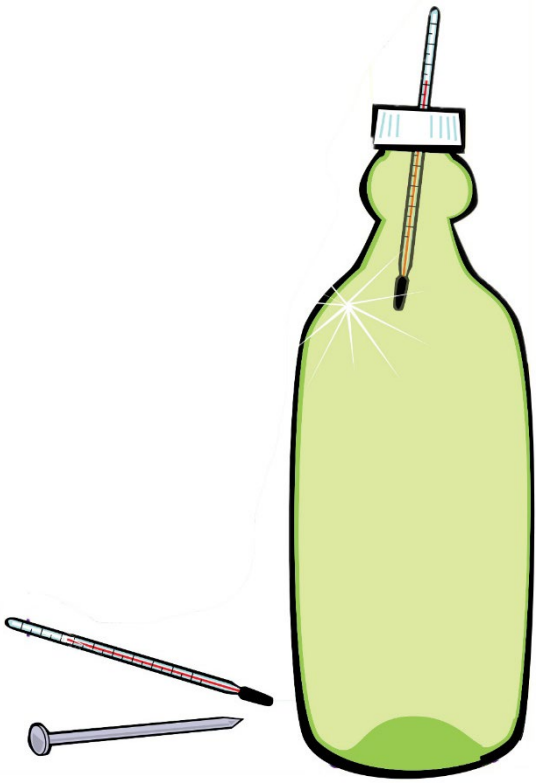
ACTIVITY DIRECTIONS

1. Both thermometers and the bottle should be outdoors on the ground in full sunlight.
2. Using the nail, make a hole near the top of the plastic bottle.
3. Place one of the thermometers in the hole.
4. Place the other thermometer outside the bottle, next to it on the ground.
5. Be sure that both thermometers are receiving the same amount of sunlight.

DISCUSSION

What happens? Do both thermometers register the same temperature? If not, which one is higher?

Record and report your findings.



THERMAL ENERGY PUT TO WORK

AIM:

Can thermal energy be made to do useful work? Determine if thermal energy can be used for work.

REQUIRED MATERIALS

- Plastic 1-litre bottle
- Large balloon
- Bowl of hot (not boiling) water
- Bowl of iced water
- Small rock

ACTIVITY DIRECTIONS

1. Cool the balloon and the bottle in the freezer for 5 minutes.
2. Fill the bowl with hot, not boiling, water.
3. Put the balloon over the mouth of the bottle making sure the air has been squeezed from the balloon.
4. Place the bottle into the hot water.
5. The air inside the bottle should expand and inflate the balloon.
6. After it is inflated, put the bottle in the bowl of iced water and watch it deflate.
7. Design a device to convert expansion and contraction into usable work, such as lifting a rock.
8. Design a device that circulates hot, then cold water so the balloon deflates and inflates without moving the bottle.

DISCUSSION

Were you able to make a device that performed useful work?

Can you think of devices that convert thermal energy into motion?

Can you think of a way to convert thermal energy into electrical energy?

LOCAL AIR QUALITY

Since the beginning of the Industrial Age, air pollution has been a problem. Cars and factories add to our quality of life, yet take away from our quality of air. In this investigation, local air quality is analysed.

REQUIRED MATERIALS

- 4 blank white index cards
- 4 pieces of string about 20cm in length
- Pen
- Petroleum jelly
- Cotton bud
- Small re-closeable plastic bag
- Magnifying glass

ACTIVITY DIRECTIONS

1. Tape a piece of string to each of the index cards so that the cards can be hung in different places.
2. Label the four cards: “Inside My House,” “In My Backyard,” “In My Neighbourhood,” and “Control.”
3. Using the cotton bud, spread a thin layer of petroleum jelly on one side of each card.
4. Hang the first card somewhere inside your house, the second card in your yard, and the third card somewhere in your neighbourhood.
5. Hang them somewhere they will not be disturbed for three days.
6. Place the “Control” card inside the re-closeable plastic bag.
7. After three days, gather the index cards. Use the magnifying glass to examine the cards for signs of allergens and pollution. Compare the cards to the “Control” card. Record your findings.

TOMORROW'S NEWS TODAY!

This activity encourages students to regularly read news publications, to make connections between articles and topics covered in class, and to use their imaginations to visualize the challenges and possibilities of the future.

REQUIRED MATERIALS

- Student Worksheet Paper
- Pen/pencil
- Video camera (optional)

ACTIVITY DIRECTIONS

1. Students collect 3-4 news articles and opinion pieces on human population trends and related environmental and social issues. Subjects may include, but are not limited to, the following:
    - Air pollution
    - Deforestation
    - Energy
    - Public Health
    - Land Use
    - Waste Management
    - Climate Change
    - Food Resources/Hunger
    - Migration/Immigration
    - Resource Use
    - Economics
    - Population Growth
    - Endangered Species
    - Housing and homelessness

2. Students write a one or two sentence summary of each article they bring in and submit it along with the article. Have students assemble a weekly "news briefs" bulletin board and/or a monthly newsletter summarising current population and environmental news.

3. Divide students into small groups to prepare a news telecast from the future, the year 2030, where Earth's population is over 8 billion people. News stories are based upon the collected articles and forecasting how our actions and habits in 2019 affect life on Earth in 2030. Include stories from both New Zealand and around the world related to population and environmental trends. Discuss why groups chose their particular visions of the future and how they envision over 8 billion people affecting our current way of life. What might change as the population continues to increase?

IS IT HOT IN HERE OR IS MY ICE JUST MELTING!

What would happen to the level of the oceans if the polar ice caps melted?

REQUIRED MATERIALS

- Modeling clay
- Measuring cup
- Butter knife
- Clear plastic or glass containers, approximately 2 ¼ cups in size (since you will be marking these containers with a permanent marker, make sure they are containers you are allowed to mark)
- Coloured tape or permanent marker
- Tap water
- Ice cubes

ACTIVITY DIRECTIONS

PART 1:

1. Put one cup of modeling clay into one of the clear containers. This container will be a model of the South Pole, with the mound representing the continent of Antarctica. Make the top of the dough flat and level. Leave some space between the sides of the dough and the wall of the container all around, so that you can add water later.

2. Take your model of the South Pole and carefully add around ¼ cup of water around the sides of the dough, so that the water level comes up about one-third to half of the way up the dough mound. The water represents the ocean.

3. Place two ice cubes on top of the dough, lightly pressing them down into the dough. Immediately mark the water level on the side of the container with the permanent marker or coloured tape. The ice cubes represent the southern polar ice sheet in this model of the South Pole.

What do you think will happen as the ice cubes melt?

PART 2:

Take the second, clear container and fill it about one-third to half full of tap water. The water represents the ocean. Add two ice cubes to the container and immediately mark the water level on the side of the container with coloured tape or a permanent marker. This container is a model of the North Pole, where the ice cubes represent the floating northern polar ice cap.
What do you think will happen as the ice cubes melt?

PART 3:

Allow the ice in your models to melt in a place where they will not be disturbed. Keep an eye on the ice cubes in the South Pole model to make sure they stay balanced on the dough, and that the water from these melted ice cubes is able to drain off the dough.
Once the ice has completely melted, check the water level in each container again.

Has the water level risen in any of the containers?

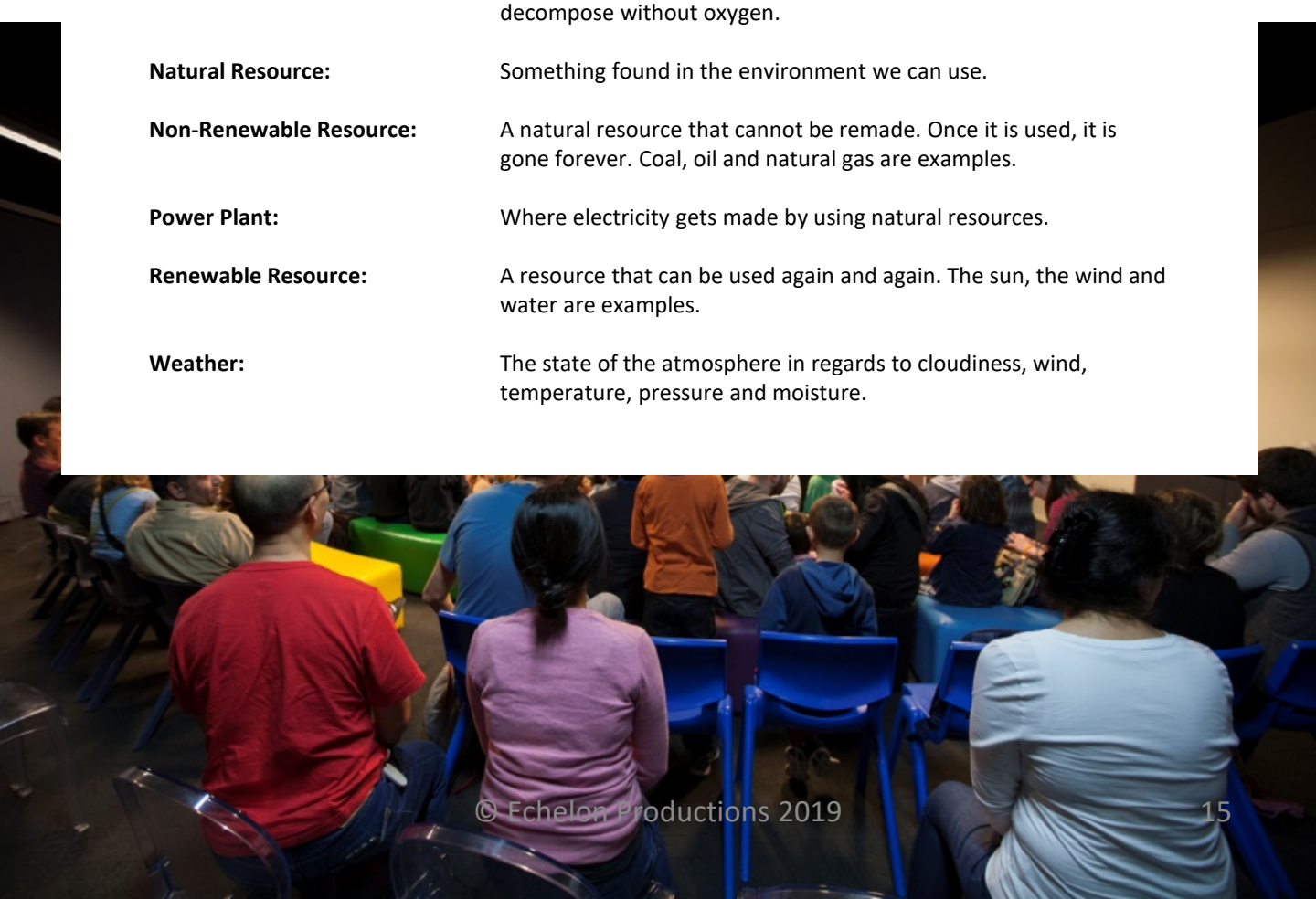
If it has, why do you think this is and what do you think the implications are for changes in sea level in the real world?

What Happened?

The ice on the North Pole is in the form of a floating polar ice cap, while the ice on the South Pole is mainly in the form of an ice sheet on top of the continent of Antarctica. As floating ice melts in water, the space the ice took up is replaced by water, so the water level in the North Pole model should not increase as the ice cubes melt. However, when an ice sheet on a landmass (such as in Antarctica or Greenland) melts, this does cause an increase in the water level. This is what you should have observed in the South Pole model, with an increase of around one centimetre, depending on the shape of the dough landmass and ice cubes. It is thought that if all of the ice on the poles melted, sea levels would increase by about 70 metres.

GLOSSARY

Atmosphere:	The gaseous envelope surrounding the earth.
Carbon Dioxide:	A gas made of one carbon atom and two oxygen atoms. CO2 is produced by burning resources like coal, oil and natural gas.
Climate:	Weather patterns of an area over a period of time.
Climate Change:	A long-term significant change in the weather patterns of an area.
Efficient:	Performing with very little waste.
Electricity:	Energy that is made at a power plant. Electricity powers many everyday appliances.
Energy:	The ability to do work. A source of usable power, like electricity.
Energy Efficient Light Bulb:	A light bulb such as an LED bulb that uses less energy than a regular incandescent one.
Greenhouse Gas:	Made up mostly of CO2 but also consisting of methane, nitrous oxide and fluorinated gases. Greenhouse gases can trap heat in the atmosphere and cause global warming.
Methane:	A colourless, odourless gas created when organic compounds decompose without oxygen.
Natural Resource:	Something found in the environment we can use.
Non-Renewable Resource:	A natural resource that cannot be remade. Once it is used, it is gone forever. Coal, oil and natural gas are examples.
Power Plant:	Where electricity gets made by using natural resources.
Renewable Resource:	A resource that can be used again and again. The sun, the wind and water are examples.
Weather:	The state of the atmosphere in regards to cloudiness, wind, temperature, pressure and moisture.



USEFUL WEBLINKS

Science New Zealand
http://www.sciencenewzealand.org/

Science New Zealand Careers – Crown Research Institutes
https://careers.sciencenewzealand.org/home

Techweek '18
https://techweek.co.nz

Science Learning Hub
https://www.sciencelearn.org.nz/

Curious Minds – Women and Girls in Science and Technology
https://www.curiousminds.nz/actions/community/women-and-girls/

Famous Scientists from New Zealand
https://www.ranker.com/list/famous-scientists-from-new-zealand/reference

New Zealand International Science Festival
http://www.scifest.org.nz/

Office of the Prime Minister's Chief Science Advisor Professor Juliet Gerrard
https://www.pmcsa.ac.nz/

NationaL Institute of Water and Atmospheric Research
https://www.niwa.co.nz/

If you or any of your students would like to find out more details about our company please visit our website: **www.performeducation.com**

2020 INCURSION PROGRAMS

perform! education

QUICK RESPONSE FORM

PHONE: 0800 775 770
EMAIL: book@performeducation.com
FAX: 0800 630 120

BOOK WEEK IN SCHOOLS 2020 – And The Winner Is…

Primary Grades 0-8 (Junior and Senior year versions available)

*Jonno has a solid gold ambition – to be crowned champion of something. Anything! The challenge is to find out what exactly he may be able to shine at. To complicate matters, every time he thinks he has the answer Claire is there challenging him! There is a story to be told but the question is who is going to get to tell it? Get ready to cheer, sing, dance and get involved as these characters go head to head with the audience towards the moment we hear the announcement '**And The Winner Is…**'*

And The Winner Is… combines a love of reading and books with a celebration of diversity and competition in a production that ties in with the **2020 Olympics!** Watch a selection of the **best New Zealand Children's Books** come to life, encouraging students to **engage with reading in an active and energetic manner** and reinforcing the idea of **inclusiveness** and **celebration of endeavour** rather than competitive results.

SCIENCE IN SCHOOLS 2020 – Launch To The Future!

Primary & Intermediate Grades 5-10 (Ages 9-14)

LAUNCH TO THE FUTURE is a 40 minute in-school presentation that focuses on how space programs and lunar science propel us into the future using **STEM!**
In a series of sketches, professional actor/educators use audience suggestions to create uniquely hilarious scenes that educate on the moon and space science.

Students will learn:

- **How science helps to solve the unsolvable (SCIENCE)**
- **Innovation drives technology (TECHNOLOGY)**
- **Space engineering helps design new solutions (ENGINEERING)**
- **How maths helps to drive the future (MATHS)**

Sketches include a worker teaching a boss about the moon, a kooky inventor linking technology to creativity and innovation, a game that teaches about space engineering, a demonstration of how maths helps explain our universe.

SCHOOL: _____

SUBURB: _____

CONTACT NAME: _____

CONTACT EMAIL: _____

PREFERRED DATES FOR 2020:

1) _____ 2) _____ 3) _____

ESTIMATED NUMBER OF STUDENTS: _____

Reserve your 2020 date NOW to receive a 10% early bird discount

Tour Dates 2020:

- *Term 2: CHCH Mon 18th May – Fri 22nd May*
- *Term 2: WELL Mon 25th May – Fri 29th May*
- *Term 2: AUCK Mon 1st Jun – Fri 26th Jun*
- *Term 3: CHCH Mon 3rd Aug – Fri 7th Aug*
- *Term 3: WELL Mon 10th Aug – Fri 14th Aug*
- *Term 3: AUCK Mon 17th Aug – Fri 28th Aug*