Secret messages revealed

Teacher Annette Martin’s Year 6 class at Inglewood Primary School investigates codes and how to crack them.

When is a code not a code? When it’s a cipher! But what’s the difference? A code is a word or phrase that replaces a message, for example, one we use in school is “Buzz buzz,” meaning “The teacher coming.” A code also can be visual. We see visual codes every day: traffic lights, road signs, even icons on your computer. They are all codes we have learnt to recognise and understand.

Although often called a code, a cipher is a way of sending a coded message by substituting each letter in a word with something else. We say the message was written in “plain text” and the coded message given is “cipher text.”

RECOGNISED CODES

In the past, recognised codes, ones that anyone could learn, were used to send messages over long distances. The most famous of these are Morse and semaphore. Each code uses something to represent each letter of the alphabet, which makes them ciphers. Morse Code

A combination of short and long electrical signals transmitted along wires over long distances. The signals are translated as dots and dashes for each letter of the alphabet.

SECRET CIPHERS

This is what cracking codes is all about – decoding and deducing messages.

How do you write a message to one person that you don’t want others to read? The answer is simple: you use a code. There are many codes from which you can choose. Here are just a few.

SHIFT CIPHER

This cipher uses the original alphabet, but the letters of the cipher text have been shifted forward a number of places.

The table below shows a +3 algorithm but you can choose any algorithm from +1 to +25.

<table>
<thead>
<tr>
<th>Plain Text</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cipher Text</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
<td>N</td>
<td>O</td>
<td>P</td>
</tr>
</tbody>
</table>

TRANPOSITION CIPHER

This cipher uses the same letters of the plain text message but the algorithm changes their order.

The message is written in a table. The algorithm is the number of rows in the table.

Solving with the +3 algorithm, we have 5 rows:

```
+3
A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
```

WORLD ON WARC

This is the same as the cipher text, except the column the algorithm was used changes their order.

The algorithm is a column of the table.

<table>
<thead>
<tr>
<th>Plain Text</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<td>I</td>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
</tr>
</tbody>
</table>

A WARTIME ESPIONAGE

Codes and ciphers were used during Wartime to communicate important information. During World War II, the language of the Naoji Native Americans was used to create a code that could not be cracked by anyone who did not know the language but the Japanese Naoji language didn’t have names for US military terms, so they invented some.

ENIGMA

An encoding and decoding machine used by the Germans in World War II. It is known as a code machine. The key to cracking the code was to know the settings of the wheels but there were billions of possible settings.

JAPANESE PURPLE MACHINE

Consisted of two electric typewriters, four rotors and an enigma machine. The original text was typed into the first typewriter. The rotors and switchboard encoded the text which was printed by the second typewriter.

MICRODOTS

Tiny photographs of text that have been shrunk to just non-inches in diameter using a special shrinking technique. They are read using a microscope.

Morse Code

Microdots were used to send secret information through the mail during World War II. They were only detected as they looked just like full stops.

CRACK-UP

Alberti wheel ciphers are used to make ciphers to find the answers to these jokes.

Q: What does a typewriter do to slugs, and up and down hills, but doesn’t like plain ciphers?

A: Typesetters.

MATERIALS

- computer and pencil

- cipher book, about

- diagram and rules

- ruler

- protector

- eraser

- pen

INSTRUCTIONS

1. Use the compass and pencil to draw a circle on each piece of card (with 20cm and 6cm diameters).
2. Draw a circle into 26 equal sections (14 degrees each).
3. Draw a circle into 36 equal sections (36 degrees each).
4. Cut out the outer and inner circles.
5. Join the circles to their centres points, using the split pin.
6. Divide the 2cm into the inner circle into 26 sections to match the outer circle.
7. In capital letters, write the alphabet in any order, in the sections of the outer circle.
8. In lower case letters, write the alphabet in the correct order, in the rim of the smaller circle.
9. To use your Alberti wheel:

   a. Write the text you want to send, for example “hello.”
   b. Decide on your algorithm, e.g. match “a” to “b”.
   c. Move the inner circle until the letter “a” lines up with “b” in the outer circle.
   d. First these letters on your plain text message on the inner wheel and write down the corresponding outer wheel letters to form the cipher text.

WORLD ON WAR

Use the Alberti wheel pictured above to write “hello” in code.

CRACKER CLUES

Here are a few clues that help you solve the puzzle of finding an unknown code:

1. The message has been changed in some way. It may have been written back to back, or have the letters turned backwards.
2. If you think you’re dealing with a substitution code, look for the letters or symbols used and the letters that have been changed.
3. Look for any letter that occurs twice, e.g. “xo” or “pxa.”
4. Look for two or three frequent words such as “the,” “this,” or “is.”

TELEGRAMS

Telegram services were used in those days. Shops used them to send messages for orders from the warehouse. People used them to send special messages on birthdays, wedding days and anniversaries. You might also get a telegram if someone had died.

BURNT BEAN

The code you have may give you a clue to breaking the unknown code.

- Learn to read and understand it before attempting to send a message.
- Practise

Mr. Bright’s grandson, Jesse Bright-Kerr, is in Ms. Martin’s Year 6 class at Inglewood Primary School.

WINTER ESPIONAGE

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Sustainable is best

It is the most widely used vegetable oil in the world but how is palm oil grown? How is it harvested and what effect does it have on the environment? Teacher Morgan Foster’s Year 6 class at Aranmore Catholic Primary School investigates.

ENVIRONMENTAL CONCERNS

The cultivation of palm oil causes deforestation. This means large areas of trees – equivalent to tens of thousands of football fields a day – have been cut down to plant oil palms. These areas were previously occupied by humans and were home to many animals and plant species. When lots of these are cut down these animals are left with no home. The deforestation of these regions is said to be making a direct contribution to climate change as tropical rainforests are key in absorbing one third of carbon emissions. The UN has called the cutting down of trees “a conservation emergency” because it believes 50 per cent of the orangutan habitat has been destroyed in the past 20 years.

A BETTER ALTERNATIVE?

Burning palm oil is not considered a satisfactory solution to the problem because this may see producers turn to using other types of oils that may cause further deforestation and have a greater impact on the environment. Using sustainable palm oil is seen as a better alternative. The Roundtable for Sustainable Palm Oil (RSPO) is an industry body organisation that was established in 2004 to promote the production and use of sustainable palm oil. It will only certify palm oil that meets specific criteria. This ensures the protection of the environment, wildlife and human rights in the production of palm oil.

EYEWITNESS ACCOUNT

To find out more about the country of Malaysia Year 6 Janine Peters interviewed Chris Marshall, a school principal who lived in Malaysia for four years.

Chris Marshall: I was on the landscape changed in terms of the jungle. When we first arrived there were areas of jungle but they were bulldozed and palm trees were planted (for palm oil).

Did you know anyone affected by the palm oil industry?

Kampung Layang is a small village inhabited by Orang Asal, the Malaysian Aborigines original inhabitants. Before the destruction of the surrounding jungle the Kampung Layang villagers’ food supplies came from two main sources. The men fished in the estuary the village is built on and the women would go into the jungle and collect plants to supplement their food source. The palm plantation does not provide them with any food source and they now rely on having sufficient income from jting to be able to buy vegetables. What effect did palm oil harvesting have on the environment?

When palm trees were planted, habitats were destroyed and massive amounts of smoke were emitted around Malaysia and Singapore as the trees were burnt down. Many people were hospitalized as the smoke made it hard to breathe. The smoke was so thick you couldn’t see.

IMPACT ON ANIMALS AND HUMANS

Deforestation caused by the cultivation of palm oil is threatening the habitats of many species. There are two types of orang-utan: the Bornean and the Sumatran. A decade ago there were 45,000-60,000 orang-utan in the wild and now there are only 7,500 Sumatran orang-utan, and in Bornea only 45,000 orang-utan.

Experts estimate there are fewer than 400 Sumatran orang-utan, about 600 pygmy elephants and only 700-900 Sumatran rhinos. The Malaysian sun bear population is believed to have reduced by 75 per cent. It is claimed the harvesting of palm oil in Malaysia would not be possible without the use of migrant workers. Most migrants are from nearby poorer countries such as Nepal and Bangladesh. While the industry creates jobs for those who might otherwise have no income, concerns about the use of migrant workers include the low wages they receive, they are unable to return home, and they work long hours in unsafe conditions.

DID YOU KNOW?

- Woorwoods and Coles are both members of RSPO.
- Woorwoods and Coles are committed to clear labelling on all their own brand products, so that the consumer can tell if a product has palm oil in it.
- The average Australian person consumes palm oil in 25-30 years.

MAKE AN INFORMED CHOICE

Melbourne-based company Don’t Palm It Off is a program that is committed to educating people about the effects of unsustainably palm oil cultivation. It has a petition on its website calling for mandatory labelling of all palm oil products in Australia.

Unfortunately palm oil is sometimes disguised on labels. A new app will scan the barcode of a product to determine if it has palm oil or certified palm oil. Go to to手掌识别app.com.au

Some of the products that contain sustainable palm oil include Hershey’s chocolate, Cadbury’s Caramilk, Cokes 2 minute noodles, Campbell’s soup, Woorwoods homestyledidiets, Arnotts biscuits and Sanctum soap.

WHAT HAVE WE LEARNED?

Owen Buttig: I agree with Morgan. I know that saying “no” to palm oil would actually make the situation worse. I don’t believe that palm oil should be grown and harvested sustainably. We need to learn how to use the contents of palm oil in a way that doesn’t affect the environment.

Sophie Ross: I have learnt heaps. I didn’t know palm oil existed before this. I have learnt to check the contents of ingredients and how a simple oil can affect our world.

Chris Marshall: I have learnt to look more closely at how palm oil is grown and harvested. We need to use sustainable palm oil.

Tyra Nso: I have learnt non-sustainable palm oil can damage the environment severely and I now want all products to be clearly labelled so I can make an informed decision about the things I buy.

Tyson Farnan: If we keep cutting down the jungle to make palm oil, we are destroying the habitat of many animals will die. I have changed making products with palm oil but only if it has been grown sustainably.
Thrill of the cache

After GPS signals became available to the general public in 2000, an entertaining new pastime evolved, write SP students at Frederick Irwin Anglican School in Mandurah.

Geocaching is a modern game of hide-and-seek and seeks by anyone with a phone or tablet can play. The world geocaching means hidden location on Earth, because the prefix geo means Earth and cache is a French word for a hiding place.

Geocachers hide containers called geocaches and register the location coordinates of the caches. Hidden caches can then be located using both the coordinates and the help of a GPS (Global Positioning System) receiver, such as a smartphone. Geocaches come in all shapes and sizes, and can be found in a wide variety of locations, such as parks, in front of houses, on a busy street corner.

Geocaching is like a treasure hunt because caches usually contain treasures that can be traded, such as coins or other trinkets. With more than three million registered geocachers worldwide and $1000's and $1000's in value, there is likely to be a cache close by waiting to be found.

HOW IT BEGAN

On May 1, 2000, then US president Bill Clinton announced that the signals from GPS satellites (previously scrambled by the US military) would be available to the public. Two days later, an American named David Ulmer, who wanted to test the accuracy of the GPS signals, hid the first geocache – a container with a logbook, pencil and trinkets – in woodland at Buxton Park, Oregon, and then posted the location coordinates online. Within a day the cache was found by Mike Tregear of Vancouver, Washington. It didn’t take long before other players started hiding and finding the location coordinates of their own caches, and geocaching spread across the globe.

WHY GO GEOCACHING?

Getting out into the great outdoors is one of the many drawcards of geocaching.

Geocaching is a fun and friendly activity suitable for people of all ages and genders.

It is inexpensive. You don’t have to go too far from home to hunt for a hidden cache, and the geocaching apps are free to download.

It can be done anytime, anywhere and can be enjoyed at the earliest of ages.

Caches are hidden in significant or meaningful places, so you will learn more about the history, geography and culture of places along the way.

It is a great way to meet new people. Geocaching communities regularly organise public events at which geocachers can get together and share common interest.

HOT TIPS

Take a view to record your geocaching name and date on the logbook.

Expect the natural environment and please Cache In Trash Out (CITO) by picking it up along the way and not leaving anything behind.

At the cache location rely on your “geo-sense” rather than your GPS device to find the cache because they are often deliberately camouflaged.

Leave something of equal or greater value if you take a trade item from a cache.

Only place items in the cache that are friendly and avoid any food, explosives, litter, drugs or alcohol.

Leave the cache exactly as you found it so that other geocachers can enjoy the same experience as you.

Respect all local laws, regulations and traditions when geocaching.

STAYING SAFE

Learn how to correctly use your GPS device and take spare batteries.

Read the geocache description, online or via the geocaching app, to find out the size of the cache, items in the cache, and what to expect at the cache location.

Select a cache with a rating that matches your abilities. Geocaches are rated in two categories, each with a scale from one to five. The difficulty category relates to the mental challenge of finding a cache, while the terrain category describes the physical environment.

Wear appropriate clothing and take basic supplies like water, snacks, sunscreen, insect repellent.

The environment can provide extra obstacles to your search so always be aware of your surroundings.

Don’t forget to tell your cache finder online or via the geocaching app.

GETTING STARTED

Download the free geocaching app on your smartphone or tablet and follow the instructions.

If using an alternative GPS device, follow these steps:

Create a free account and sign into geocaching.com.

Tell the co-ordinates of the geocache location into your GPS device and go find the cache.

Don’t forget to log your cache find online or via the geocaching app.

One of the Class SP travel bags released into a geocache by the Mandurah Ponies.

SP students Jake Nelson and Jack Maclean retrieve a geocache embedded in a cross-stitch by geocaching in Mandurah, Western Australia.

WHAT’S GOOD ABOUT IT?

SP students at Frederick Irwin Anglican School in Mandurah say what they like best about geocaching:

Now I enjoy the thrill of the chase and the satisfaction when I find the cache.

Free. Geocaching can take me to amazing places that I have never seen before.

Geocaching is the best adventure travel experience I have ever had.

Geocaching can take me to amazing places that I have never seen before.

Geocaching is a way to travel and explore the earth.

The thrill of the chase.

Geocaching is like treasure hunting.

Geocaching is a fun and friendly activity.

Geocaching is like a treasure hunt because caches usually contain treasures that can be traded, such as coins or other trinkets.

Geocachers hide containers called geocaches and register the location coordinates of the caches. Hidden caches can then be located using both the coordinates and the help of a GPS (Global Positioning System) receiver, such as a smartphone. Geocaches come in all shapes and sizes, and can be found in a wide variety of locations, such as parks, in front of houses, on a busy street corner. With more than three million registered geocachers worldwide and $1000's and $1000's in value, there is likely to be a cache close by waiting to be found.

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2018

Junior journos at work

TALENDED STUDENTS WRITE THIS WEEK'S SPECIAL EDITION

BREMER CANYON

MEET THE AMAZING PERFORMERS P3
THE COMPLEX WORLD OF CANBERRA P6
BRIGHTEN UP YOUR ROOM WITH CRAFT P8
Babies are more orange and black than white and black.

Albany's Bethel Christian College Year 3 and 4 students are this week’s ED! journalists. Picture: Laurie Barnes

**Our grand canyon under the sea**
You've heard of whale sharks at Exmouth and dolphins at Monkey Mia, but have you heard of orcas in the Bremer Canyon? Year 3-4 students at Bethel Christian School in Albany reveal the fascinating story behind the discovery of an amazing hot spot under the sea.

S
o much is still unknown about the Bremer Canyon, a mysterious "hot spot" 300m off the shore of Wellingtons town Bremer Bay. What is certain is that one of the most amazing collections of marine animals in the world spend several months a year in the canyon that drops down more than 300m on the Southern Oceans, continental shelf. A hot spot is a place that has an extraordinary amount of activity. Scientists say it developed because the Leeuwin Current travelling around the coast weaves during January to April. Arriving with a current to sweep life giving nutrients towards the surface. This sets off an incredible food chain, and many animals - such as huge squid, many whale species, abalone, mutton birds, dolphins, calves. Dolphins and huge sunfish - gather at the canyon's hot spot. In the very tip of the food chain is the biggest congregation of orcas - otherwise known as killer whales - in the entire southern hemisphere. When they are not feeding, orcas are as playful as children, as cute as a baby and faster than Simon Bell!

**Five facts about whales and squid**

1. Sperm whales dive hundreds of metres to catch giant squid and can hold their breath for three hours.
2. Napkin and sperm whales use echolocation to find the squid. The deep ocean is so dark that the whales make clicking sounds and listen to the echoes to work out where the squid are.
3. Orcas use the echolocation to see what the sperm whales swallow with the squid, the orca grabs them from.
4. Sperm whales have waco motive to go to the swam at Bremer Bay with huge white swarms on them, a massive white cloud.
5. Squid feed can grow to around 2m in length.

**Microplastics in Bremer Canyon**
We also visited University of WA researcher Dr Simon Paterson in Albany. Simon believes that microplastics (small pieces of plastic) that pollution the environment could harm the marine life.

**Bethel students:** What's your perspective on Bremer Canyon and why is that important?

**Dr Paterson:** The flaxed orner, also known as the ocean's food, is graceful and comes here in summer to breed. They spend winter near the equator where it's warm. Unfortunately, these birds eat plastic and across one third have plastic in their systems.

Students: How do microplastics get into our peace and haveDomains are they?

**Dr Paterson:** Most of the plastic comes from countries in Asia and washes up here on the ocean currents. They are very damaging. Small organisms eat some of the plastic; then they get eaten by bigger organisms and we end up with a lot of microplastics in them.

Students: Do microplastics make it to the bottom of the Bremer Canyon?

**Dr Paterson:** It is likely that there are plastics in the sediment of the Bremer Canyon. Researchers who look at sediment from the bottom of the ocean believe that plastic is everywhere.

**Students: What do you think will happen if we continue to allow so much plastic into our environment?**

**Dr Paterson:** Unfortunately, many animals will die through ingestion and suffocation but they may also have fewer babies. So some species may not survive. Dr Paterson told us that mammalian birds and penguins (which are a part of the food chain) already have plastics in them. We need to reduce the amount of plastic in the ocean.

**Did you know?**

1. Killer whales are not actually whales. They make the biggest member of the dolphin family.

2. Orcas in Bremer Canyon use a different language to others elsewhere.

**Orcas feed on giant squid.**

**Picture:** Bremer Map Art by Carlyte Boyce.
Konichiwa, Japan!

While it may seem a world away, if you play Pokémon, eat sushi or drive around in a Toyota you have a little bit of Japan in your life! Year 5/6 students from Alkimos Primary School lift the lid on this fascinating nation ahead of the rugby World Cup final and Tokyo 2020 Olympic Games.

Japan is a country full of rich traditions that have lasted for many centuries. Located in the northern hemisphere, Japan has 4,462 islands, of which only 340 are populated. Known as the Land of the Rising Sun, Japan is located close to North and South Korea, and east of China.

The Japanese lifestyle is vastly different to life Down Under. Futuristic inventions, mega cities and a population five times that of Australia mean life in Japan often moves at a cracking pace.

Japanese food, fashion and entertainment are well recognised around the world; however, the traditions, beliefs and mythical creatures are also a big part of Japan's uniqueness. Japanese people live in discipline and structure, particularly as they worry about the past natural disaster that could impact their country.

**FANTASTIC FASHION**

Japan fashion consists of bright colours and unique designs that are very hard to miss. It all started with the kimono, one of the most traditional pieces of clothing. It is a robe-like dress long sleeves, most commonly decorated with flowers or flowers. There are many different variants of kimono, including different fabrics, fabric length and sleeves which all have special meanings for the wearer or occasion. Today, kimonos are generally only worn for special events such as weddings and tea ceremonies.

Recently, Japanese fashion has become more popular in Japan. A kimono is a short coat, worn over a voluminous skirt. When wearing a kimono, people wear petticoats, a corset and thick shoes to make themselves appear more Japanese. There are many styles in Japan such as gothic, sweet, classic and punk.

**Cool cosplay**

The great tradition of dressing up when it is not Halloween is practised all over Japan. The magical world of cosplay is a huge, vibrant industry, originating from the words 'costume play'. People can be seen as characters from the movies or video games. They can dress colourfully or darkly, negligibly or creatively. Professional cosplayers can make as much as $50,000 per appearance and sometimes events run outside the Komiket in Tokyo and World Cosplay Summit in Nagoya. Cosplayers are recognised all over Japan and the world.

**FACTS ABOUT JAPAN**

- Capital: Tokyo
- Language: Japanese
- Population: 128 million
- Currency: yen ($1 = about 75 yen)
- Climate: temperate, with cold winters and hot summers, tropical life expectancy 80 years

**DEADLY DISASTERS**

The famous shape around the left is the 375.6 mountain called Mt Fuji. The highest point in Japan. Mt Fuji is classified as an active volcano, with 340,000 deaths. There are many small clubs in Japan, including different fabrics, fabric length and sleeves which all have special meanings for the wearer or occasion. Today, kimonos are generally only worn for special events such as weddings and tea ceremonies.

**WARRIOR BATTLEFIELD**

When you think of a samurai, you automatically think of a warrior fighting for his lord. The samurai were feared and respected by all. They were skilled in swordsmanship and often wore armour to protect themselves.

**A WORLD OF TECHNOLOGY**

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- Mt Fuji is classified as an active volcano, with 340,000 deaths. There are many small clubs in Japan, including different fabrics, fabric length and sleeves which all have special meanings for the wearer or occasion. Today, kimonos are generally only worn for special events such as weddings and tea ceremonies.

**WARRIOR BATTLEFIELD**

When you think of a samurai, you automatically think of a warrior fighting for his lord. The samurai were feared and respected by all. They were skilled in swordsmanship and often wore armour to protect themselves.

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