Digital Technologies @ Home
Unplugged activities for students

Teachers

Parents and carers

This activity is for: Years 7-10

Indoor Scavenger Hunt

With thanks to David Schulz, year 10 student, for providing this content.

This activity teaches…

In this activity, students solve seven puzzles to navigate their way around the house to find a hidden treasure. Puzzles are solved by applying a range of data representation, binary number, pixel graphic, morse code and simple cryptography skills.

It is targeted towards secondary students and is expected to take 15 to 45 minutes.

Care has been taken to choose rooms that are representative of typical Australian households, However, if your settings are different, we ask parents and carers to be creative. For example, if you don't have a study, then designate an area in your house or unit (for example a wardrobe) and call it study.

Encryption and data representation are important ideas in computing. Encryption allows computers to communicate securely with one another. We use secure ciphers (which are much harder to crack than the ones in this activity) to protect communication on the Internet, e.g. to stop hackers getting our credit card details when we shop online. Without encryption, every message we send is at risk.

Many ideas can be communicated using symbols and conventions. In this activity, dots, dashes, pixel graphics and strings of 1s and 0s are all used to communicate important information. Computers also use conventions to store different kinds of data, including using binary numbers.

You will need…

A treasure. Easter eggs, a toy, or any other appropriate prize will do nicely.

Hide the treasure in the child's / children's bedroom.

Cut out the puzzles on pages 3 and 4 and hide them in rooms as follows.

Puzzle 1	Hand it to the child / children
Puzzle 2	Kitchen
Puzzle 3	Study
Puzzle 4	Parent's Bedroom
Puzzle 5	Living Room
Puzzle 6	Bathroom
Puzzle 7	Dining Room

This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org

Indoor Scavenger Hunt

Getting started (read this with your child):

A treasure is hidden somewhere in the house/unit. To solve this puzzle, you must decode the provided clues by correctly decoding/translating them. Each solution will lead you to the next room. Sometimes, the solution to a problem is a number, which maps to a room as shown in the following table.

1	Parent's Bedroom
2	Bathroom
3	Kitchen
4	Dining Room
5	Children's Bedroom
6	Living Room
7	Study

When numbers are provided in a puzzle, translate them to their corresponding letter. For example, 123 = ABC (Number decoding).

Remember! You **must** show your working, and the rooms which you travel through to successfully complete the challenge.

This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org

Indoor Scavenger Hunt

A treasure is hidden in the house. Solve the puzzles to find it.

Students

Puzzle 1

Here is your first secret message:

dash-dot-dash
dot-dot
dash
dash-dot-dash-dot
dot-dot-dot-dot
dot
dash-dot

Solve it and go to the stated room.

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

Puzzle 2

These letters seem to make no sense at all. It must be a code. You figure it out and make your way to the answer.

Brxu remhfwlyh olhv lq wkh vwxgb...

Tip: A Caesar Cipher is a way of encrypting a message. To encrypt a message, letters are shifted to the right by a shift key. For example if the shift key is 1, the message ABC becomes BCD. To decrypt BCD we shift each letter one to the left, and it becomes ABC.

The shift key for this message is the **number** of the room you are in.

This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org

Puzzle 3

Here is another message for you: **Your forerunners nod off hereabouts**. You realise that your parents scrambled the message and changed the words around, but only so that they seem different - the words used are all synonyms for our normal name for the next location.

Puzzle 4

Here is the fourth puzzle for you:

20-8-9-19
15-14-5 9-19
6-1-9-18-12-25
5-1-19-25
25-15-21
23-1-20-3-8
20-22
8-5-18-5

Each of the groups of numbers is a word. Solve the puzzle to continue your journey.

Puzzle 5

A simple riddle is told, and you listen intently: “Kids love going here for a swim, but this isn’t the pool. Dogs also love it, because they can sometimes drink out of something else in this room.” Go to that room.

Puzzle 6

What will you do with this puzzle?
010101010 – 010100110 = ? As the equation becomes clear, you hurry to the room, but only after you’ve quickly taken a sip of water.
Tip: If you need an extra hint to solve this, ask for a clue.

Puzzle 7

Make sense of this cryptic sequence of 1’s and 0’s: **1111110000100001111100001000011111**.

Use this 5 x 7 table to solve this puzzle. Tip: If you need an extra hint to solve this, ask for a clue.

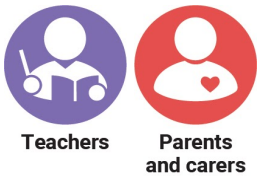
Puzzle 8

This is the final room. The treasure is here somewhere.

This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org

Answer key

Choose if you want to print this for your kids or keep it to yourself!



Answers

Puzzle 1
KITCHEN

Puzzle 2
The shift is 3, because the riddle is being solved in the kitchen.

By shifting the letters in **Brxu remhfwlyh olhv lq wkh vwxgb** by three to the left (remember, we are uncoding), the message reads : **Your objective lies in the study**

Puzzle 3
Your parents sleep here = Parent's bedroom

Puzzle 4
Each number gets converted to its corresponding letter in the alphabet. For example, 123 = ABC. The resulting message is: **this one is fairly easy, you watch tv here** = Living Room

Puzzle 5
Bathroom

Puzzle 6
The two strings of 1's and 0's represent binary numbers:

Clue: If the child is stuck, point out that these are binary numbers.

010101010 = 170
010100110 = 166

170 - 166 = 4. The solution is the Dining Room

Alternatively, observe that the first five bits of both numbers are identical and result to 0 in a subtraction. You can therefore simplify both numbers to 1010 - 0110 = ten - six = four.

This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org

Answer key

Choose if you want to print this for your kids or keep it to yourself!

Teachers

Parents and carers

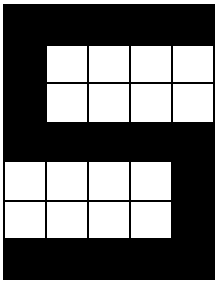
Puzzle 7

Pixel graphics.

Clue: If the child is stuck, suggest to Split the binary number into seven groups of five bits

11111
10000
10000
11111
00001
00001
11111

Enter them into the 5*7 matrix. A 1 corresponds to a black pixel. The resulting number is 5, which is the child's / children's Bedroom.



This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org

Want more?

Here are some further activities, online resources, assessment ideas and curriculum references.

Adapting this activity

This activity can be a springboard for students to create their own clues for siblings or parents to continue the scavenger hunt. It could also be used for a collaborative class activity where students can create clues to send a secret message around the class, translating it from a cipher to morse code, number translation, etc.

Older students may enjoy exploring more complex methods of encryption such as hashing algorithms: https://brilliant.org/wiki/secure-hashing-algorithms/ (which wouldn't work well in this activity as they can't be decrypted.)

Keep learning

For High School students interested in learning more about how computers communicate with encrypted messages, try this course: cmp.ac/crypto.

For students who would like to explore data representation, and how computers store images, text and music using 1s and 0s, try this course: cmp.ac/pythondatarep

For teachers creating a portfolio of learning or considering this task for assessment

Ask students to create their own scavenger hunt clues based on the activities in this worksheet.

Linking it back to the Australian Curriculum: Digital Technologies

Data representation
Investigate how digital systems represent text, image and audio data in binary (ACTDIK024 - see cmp.ac/datarep)

Refer to aca.edu.au/curriculum for more curriculum information.

This content is licensed under a Creative Commons Attribution 4.0 International license.
Developed by the Grok Academy Limited (formerly the Australian Computing Academy, the University of Sydney). Find out more: grokacademy.org, get help: help@grokacademy.org