Practice da Vinci Decathlon Tasks

VIRILE AGITUR

International da Vinci Decathlon

Celebrating the Academic Gifts of International Youth

EXCITE · CHALLENGE · ENRICH

Art and Poetry

Session 5

'Learn how to see. Realise that everything connects to everything else' Leonardo da Vinci.

Team Number _____

The Task: Discovery

Background Information

Our curiosity, imagination and ambitions drive us to make discoveries about self, others and the world around us. These discoveries can generate a plethora of innovative and exciting new things from art to music, science and beyond. Leonardo da Vinci was inspired by nature and spurred on by his imagination, extensive knowledge of so many aspects of life and the drive to make his mark on the world. He believed that sight was our most important sense and that *"saper vedere"* - *"knowing how to see"* - was crucial to creativity and life. Leonardo valued the interconnectedness of life and saw Science and Art as complementary rather than distinct disciplines.

The Task

Your team's task is to create an artwork and poem inspired by one of Leonardo's inventions, paintings or drawings. Imagine that you have been transported back to the day when the invention, sketch or painting was first unveiled in the late 15th or early 16th century. Compose a poem that records what you see, how you feel and what you have discovered. Create a **3D artwork** that captures how you see the invention, sketch or painting.

Just as Leonardo valued the interconnectedness of life, the poem and the 3D artwork must be closely interrelated.

You must adhere to the following guidelines:

- The artwork must be **3-dimensional** and can only use the paper supplied. You can use sticky tape but do so sparingly.

- The poetry and the artwork **must be connected thematically** and **physically**.

- The poem must be in the **first person** and include one example of **onomatopoeia**, **metaphor** and **sibilants**.

- Submit an explanation of how you have incorporated all of the components in the artwork and poem.

The Materials for the Artwork

- Three pieces of A4 paper (You do not have to use all three pieces)

- Coloured pencils or crayons

- Sticky tape (optional)

Team Number _____

Submission of Task
You must complete and submit the following form that explains how you have utilised the components in your original 3D artwork and poem.

Components
Explain briefly how you have incorporated the following in your poem. Explanations are worth **5 marks**.

🗝 First person perspective of someone living at the time of Leonardo da Vinci (2 marks)

🗝 At least one example of onomatopoeia (1 mark)

Provide your example: _____

🗝 At least one example of metaphor (1 mark)

Provide your example: _____

🗝 At least one example of a sibilants (1 mark)

Provide your example: _____

TOTAL: /5

Marking Criteria	Poem						Art					
Interpretation of the task	0	1	2	3	4	5	0	1	2	3	4	5
Originality and creativity of the 3D artwork and the poem	0	1	2	3	4	5	0	1	2	3	4	5
The interconnectedness of the poetry and the 3D artwork			0	1	2	3	4	5				
The message conveyed through the art and poetry about discovery			0	1	2	3	4	5				
TOTAL												**/30**

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

Cartography

'*Somewhere there is a map of how it can be done*' Ben Stein.

Team Number _____

MAPPING SKILLS: TASK 1

Refer to the **Source Booklet provided** to help you answer the questions below. Complete all answers on the answer sheet provided by placing and 'X' in the box for the correct response

Use the multiple-choice answer sheet for Questions 1-15 on page 6

Refer to **Source A** to answer Questions 1 and 2.

1.   What is the name of this type of map?
       (A)   Cadastral
       (B)   Choropleth
       (C)   Isopleth
       (D)   Précis

2.   Which of these suburbs has the lowest population density in 2001?
       (A)   Maple Ridge
       (B)   Port Coquitlarn
       (C)   Richmond
       (D)   Vancouver

Refer to **Source B** to answer Question 3.

3.   Which regions, ranked in descending order, provided the great number of immigrants in Canada in 2001?

       (A)   Eastern Asia, South East Asia, Southern Asia
       (B)   Eastern Asia, United Kingdom, Southern Asia
       (C)   Eastern Europe, Southern Asia, South East Asia
       (D)   South East Asia, Southern Europe, Eastern Asia

Refer to **Source C** to answer Question 4.

4.   Approximately what percentage of immigrants to Vancouver came from Eastern Asia in 2001?

       (A)   13%
       (B)   26%
       (C)   31%
       (D)   36%

Refer to **Source D** to answer Questions 5-7.

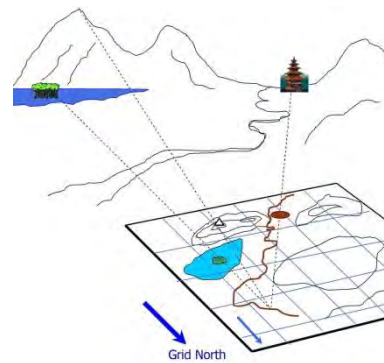**5.** What is the bearing of Hood Point (GR 278174) from Point Atkinson (GR 281164)?

(A) 18°
(B) 162°
(C) 198°
(D) 342°

6. What is the general direction of flow of Sisters Crock in AR 2817?

(A) NNE
(B) NNW
(C) SSE
(D) SSW

7. What is the average gradient between Hollyburn Mountain (GR 286173) and the navigation light (GR 306165)?

(A) 1:1.8
(B) 1:2.3
(C) 1:4.6
(D) 1:5.2

Refer to **Source E** to answer Questions 8 and 9.

8. What is the approximate area, in square kilometres, of Stanley Park, north of Northing 60?

(A) 0.75
(B) 2.5
(C) 3.5
(D) 4.75

3

9. What is the shortest distance, in kilometres, by road from the Sportsplex (AR 9264) to the hospital (AR 9562)?

    (A)   3.2
    (B)   4.2
    (C)   5.2
    (D)   6.2

Refer to **Sources E and F** to answer Questions 10 and 11.

10. What is the location of the building labeled A?

    (A)   GR 920594
    (B)   GR 922593
    (C)   GR 937592
    (D)   GR 951595

11. In what direction was the photographer facing when the photograph in Source F was taken?

    (A)   NE
    (B)   NW
    (C)   SE
    (D)   SW

Refer to **Sources E and G** to answer Question 12.

12. At approximately what time of day was this photograph taken?

    (A)   9 am
    (B)   12 noon
    (C)   3 pm
    (D)   7 pm

Refer to **Sources H, I and J** to answer Question 13.

13. What is the average January temperature in the tundra?

   (A)   Between 0°C and 8°C
   (B)   Between -8°C and 0°C
   (C)   Between -24°C and -16°C
   (D)   Between -40°C and -24°C

Refer to **Sources I and J** to answer Question 14.

14. What vegetation is found at the Arctic Circle?

   (A)   Hemlock
   (B)   Mosses
   (C)   Oak
   (D)   Pines

Refer to **Sources H, I, K and L** to answer Question 15.

15. Which of the following explains the difference in precipitation patterns between Vancouver and Saskatoon?

   (A)   Vancouver is higher in elevation.
   (B)   Saskatoon is located inland and at a lower latitude.
   (C)   Saskatoon is influenced by high pressure cells in July.
   (D)   Vancouver is a coastal city and experiences orographic precipitation.

…………………………………………………………………..

Mapping Skills Answer Sheet:

Place and 'X' in correct box

Q's	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

TOTAL: /15

SOURCE BOOKLET

Source A – Vancouver (Canada) population density (2001)

N
W — E
S

48°13'N

0 2 4
Kilometres

Total population
for Vancouver = 1 986 965

Persons per square km

- 22 001–28 500
- 13 001–22 000
- 7 501–13 000
- 4 501–7 500
- 2 501–4 500
- 501–2 500
- 4–500

123°06'W

Source B – Immigration to Canada (2001)

Source C – Immigration to Vancouver (2001)

Regions for Sources B and C

- Southern Asia
- South East Asia
- Eastern Asia
- West Central Asia and the Middle East
- Africa
- Southern Europe
- Eastern Europe
- Northern and Western Europe
- United Kingdom
- Caribbean and Bermuda
- Central and South America
- United States
- Oceania and other countries

Source D – Vancouver topographic map (1986)

Source F – Vancouver Harbour

Key for Sources D and E

City or municipality boundary	
Reserve, park, etc boundary	
Horizontal control point	
Spot elevation	
Marsh or swamp	
Falls; rapids	
Foreshore flats	
Rocks; rocky ledge; rocky reef	
Wharf; breakwater; pier; seawall	
Ferry slip; dry dock; ramp	
Wooded area	
Contours	
Ferry	
Navigation light	
Seaplane base; seaplane anchorage	
Vessel anchorage: large; small	

8

Source E – Vancouver topographic map (1986)

1 : 50 000
Contour interval: 20 m

Legend:
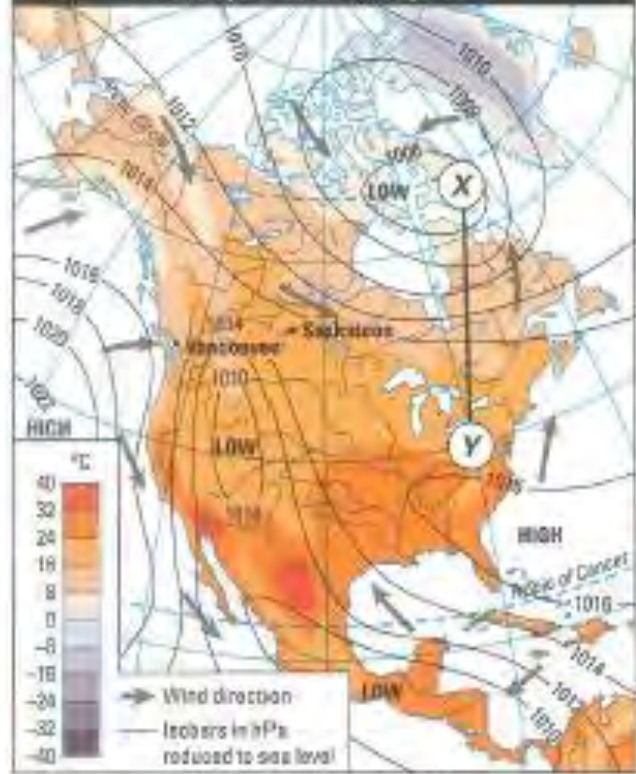- Dual highway
- Road, hard surface, more than 2 lanes
- Road, hard surface, 2 lanes
- Road, hard surface, less than 2 lanes
- Road, loose or stabilised surface
- Trail
- Railway, single track; multiple track
- Railway station; bridge
- House; large building
- Church; school
- Post office; telegraph office
- Elevator; tower
- Cemetery; historic site
- Power transmission line
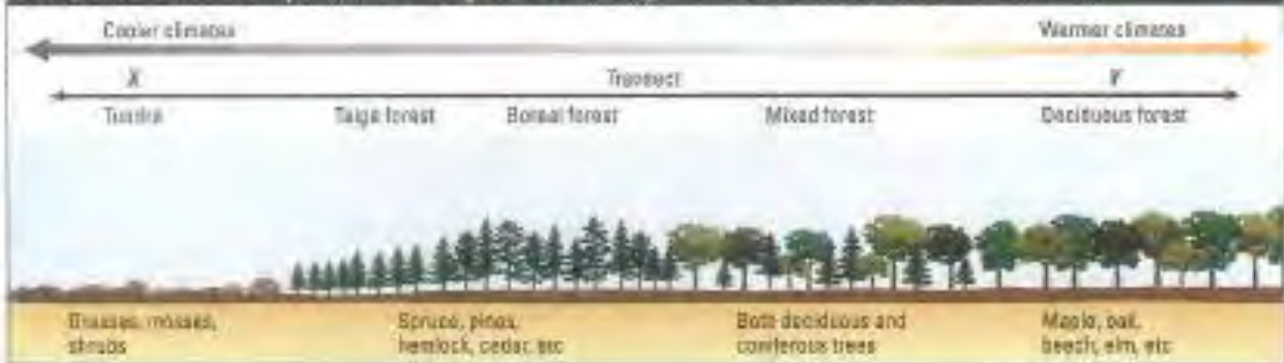- Campsite; picnic site
- Retaining wall; small

Source G – Vancouver

Source H – Average Surface temperature and pressure (January)
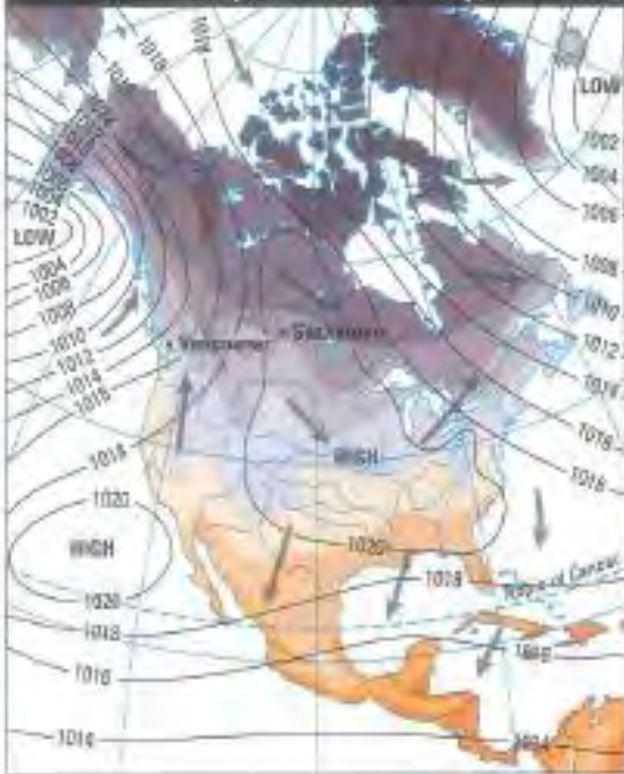
Source I – Average Surface temperature and pressure (July)

°C
40
32
24
16
8
0
-8
-16
-24
-32
-40

→ Wind direction

— Isobars in hPa reduced to sea level

Source J – General pattern of vegetation along transect from X to Y (in Source I)

Cooler climates

Warmer climates

X

Transect

Y

Tundra

Taiga forest

Boreal forest

Mixed forest

Deciduous forest

Grasses, mosses, shrubs

Spruce, pines, hemlock, cedar, etc

Both deciduous and coniferous trees

Maple, oak, beech, elm, etc

Source K – Vancouver climate graph

Temperature °C — Elevation: 3 m — Precipitation in mm
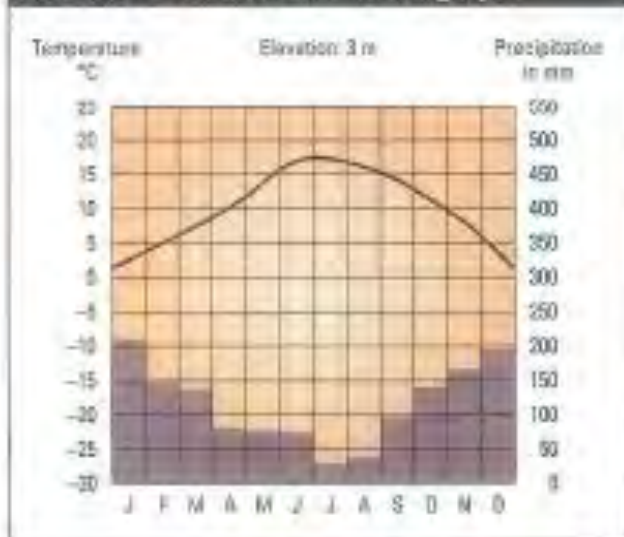
Source L – Saskatoon climate graph

Temperature °C — Elevation: 481 m — Precipitation in mm
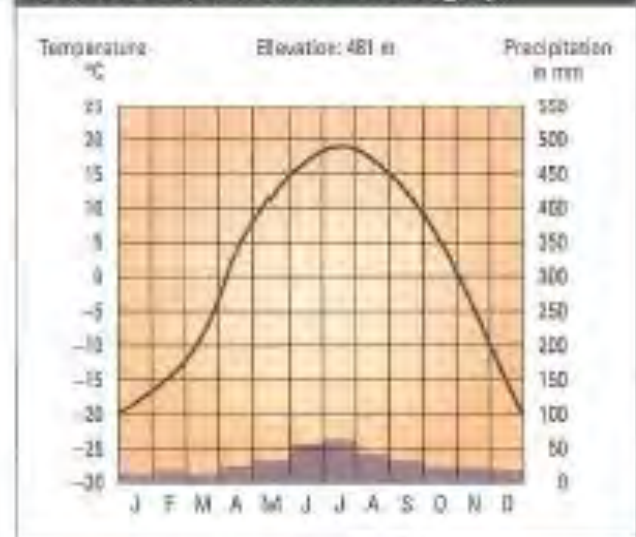
Maps and Discovery

Background Information

Maps were by Leonardo's time an old invention having been used since around 8,000 B.C. They were however extremely rare in use and certainly not in the absolute detail and accuracy with which Leonardo introduced.

LEONARDO DA VINCI MAP: TOWN IMOLA, ITALY

YEAR: 1502

In order to create the map above Leonardo walked the distances personally to measure all the contents of the map, including every street and field. Leonardo did not have devices of any sort that cartographers of today rely on.

TASK 2:

Your team's task is to create a hand written report which traces the development of cartography from ancient maps to present day maps. Your report should note important cartographers, voyages of discovery, varying cartographical techniques and technologies that has seen the art of cartography develop to the level of sophisticated mapping that exists in the world today.

TOTAL: /20

Visual Hints;

The Cartography Pool of Discovery
People, Events and Technologies

Ptolemy; Mercator, mapmaking, cave paintings, ancient maps, three-dimensional sphere, distortion, reference point, printing press, computers, satellites, Vasco da Gama, James Cook, John Harrison, latitude, longitude, flat earth, Columbus, Magellan, projections, G.I.S., GPS, surveying, trigonometry, globes, parallels, meridians, topographic, Ordinance Survey, cadastral, choropleth, features, cultural, physical, Google maps, manually constructed, compass, printing press, telescope, sextant, quadrant vernier, more accurate maps, accurate reproductions, advances in photochemical technology, computer hardware, computer screens, plotters, printers, scanners (remote and document) and analytic stereo plotters along with visualization, image processing, spatial analysis and database software, digital raster graphic , The **Great Trigonometric Survey**

You do not have to use all or any of the above in your group report

Cartography Report:

_____

_____

_____

_____

_____

_____

(Should you need more paper just ask supervisor)
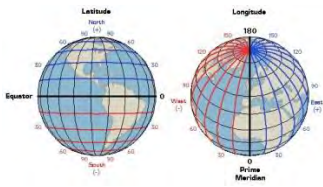
Discovery via the World Grid of Latitude &Longitude:

TASK 3:

Your team's task is to plot the following grid points onto the World Map provided on page 10 in the order specified then join the dots to form a well-known symbol

TOTAL: /5

Now simply name the symbol here _____

The coordinates to be joined clockwise in this order are;

90ºN, 0ºE/W

34ºS, 107ºE

34ºS, 107ºW

90ºN, 0ºE/W

Then join these coordinates, only this time anticlockwise, in this order;

90ºS, 0ºE/W

54ºN, 114ºE

54ºN, 114ºW

90ºS, 0ºE/W

Then join these coordinates clockwise in this order;
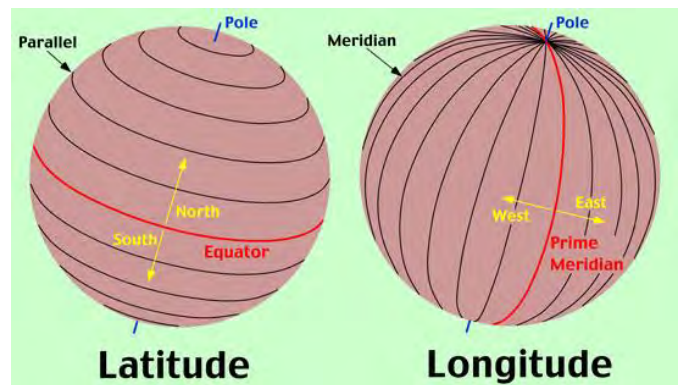
70ºN, 0ºE/W

25ºS, 80ºE

25ºS, 80ºW

70ºN, 0ºE/W

Finally join these coordinates, only this time anticlockwise, in this order;
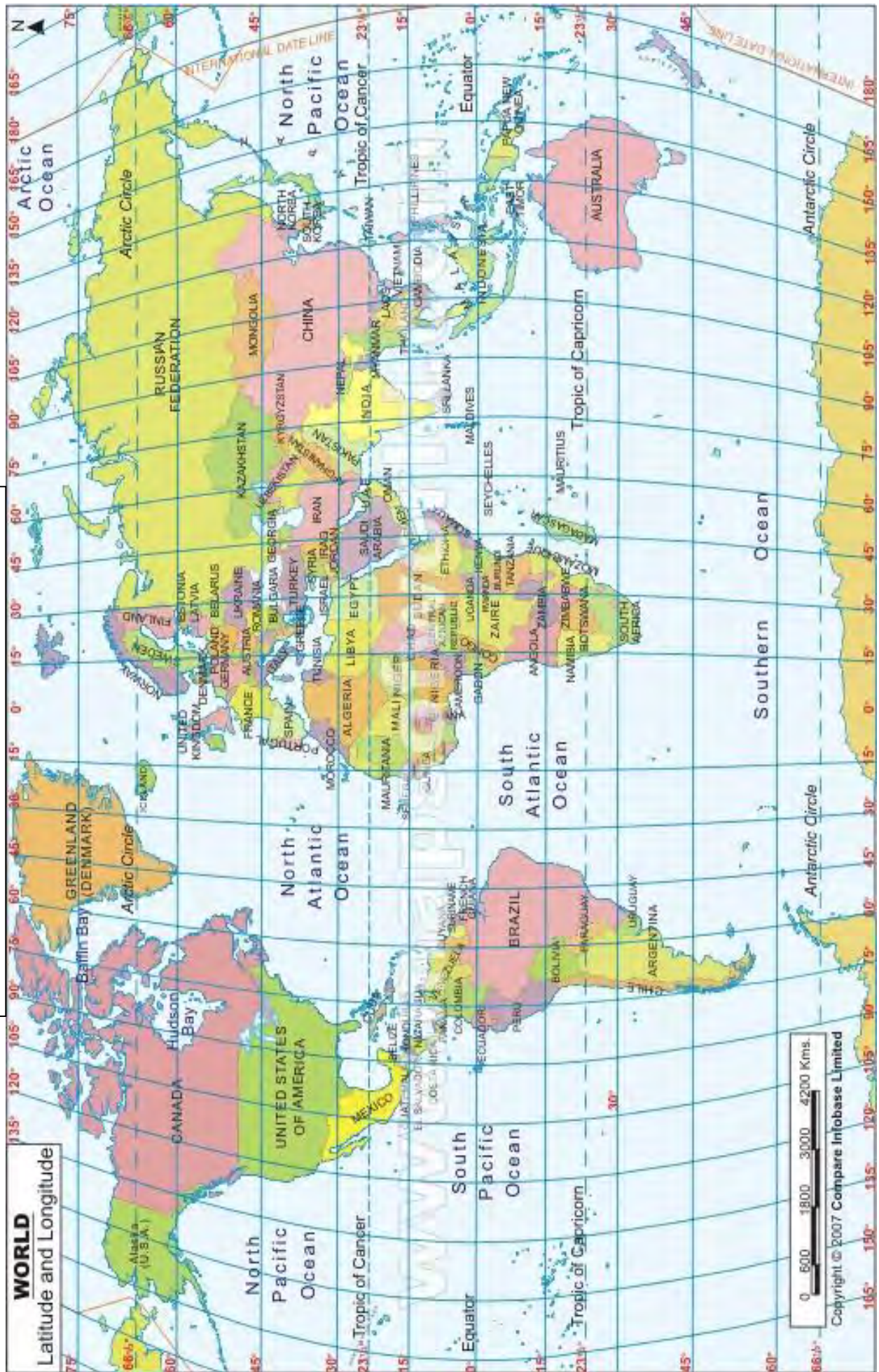
57ºS, 0ºE/W

45ºN, 85ºE

45ºN, 85ºW

WORLD
Latitude and Longitude

Arctic Ocean

North Pacific Ocean

North Atlantic Ocean

South Atlantic Ocean

South Pacific Ocean

Southern Ocean

Arctic Circle

Antarctic Circle

Tropic of Cancer

Tropic of Capricorn

Equator

INTERNATIONAL DATE LINE

CANADA

UNITED STATES OF AMERICA

Alaska (U.S.A.)

MEXICO

GREENLAND (DENMARK)

Baffin Bay

Hudson Bay

BRAZIL

ARGENTINA

PARAGUAY

URUGUAY

BOLIVIA

PERU

CHILE

ECUADOR

COLOMBIA

FRENCH GUIANA

SURINAME

GUYANA

RUSSIAN FEDERATION

MONGOLIA

CHINA

KAZAKHSTAN

INDIA

NEPAL

SAUDI ARABIA

IRAN

IRAQ

SYRIA

TURKEY

EGYPT

LIBYA

ALGERIA

MALI

NIGER

NIGERIA

SUDAN

ETHIOPIA

KENYA

TANZANIA

ZAIRE

ANGOLA

ZAMBIA

ZIMBABWE

BOTSWANA

NAMIBIA

SOUTH AFRICA

MADAGASCAR

AUSTRALIA

PAPUA NEW GUINEA

INDONESIA

PHILIPPINES

MALAYSIA

THAILAND

VIETNAM

MYANMAR

LAOS

CAMBODIA

NORTH KOREA

SOUTH KOREA

JAPAN

TAIWAN

SRI LANKA

MALDIVES

SEYCHELLES

MAURITIUS

NORWAY

SWEDEN

FINLAND

UNITED KINGDOM

FRANCE

SPAIN

PORTUGAL

GERMANY

POLAND

ICELAND

ESTONIA

LATVIA

BELARUS

UKRAINE

ROMANIA

BULGARIA

GEORGIA

DENMARK

AUSTRIA

GREECE

TUNISIA

MOROCCO

MAURITANIA

SENEGAL

0 600 1800 3000 4200 Kms.

Copyright © 2007 Compare Infobase Limited

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

EXCITE · CHALLENGE · ENRICH

Cartography

Solutions

'Somewhere there is a map of how it can be done' Ben Stein.

MAPPING SKILLS: TASK 1

Q's	A	B	C	D
1		X		
2	X			
3		X		
4				X
5				X
6			X	
7			X	
8			X	
9		X		
10	X			
11		X		
12	X			
13				X
14		X		
15				X

TASK 2: Marking Criteria for TASK 2: Cartography Report

17-20	- An excellent response which outlines in detail the forces leading to improvements in cartographic techniques over time. - Response provides a logical and well-structured answer - All statements are supported by appropriate specific examples - Change over time is evident through the use of appropriate specific examples - Excellent use of cartographic and geographic terms and concepts
13-16	- A very good response which outlines in detail the forces leading to improvements in cartographic techniques over time. - Response provides a well-structured answer - Statements are supported by appropriate specific examples - Change over time is evident through the use of some specific examples - Very good use of cartographic and geographic terms and concepts
12 - 9	- A good response which outlines in detail the forces leading to improvements in cartographic techniques over time. - Response provides a well-structured answer - Statements are supported by examples - Change over time is evident through the use of some specific examples - Good use of cartographic and geographic terms and concepts
8-5	- Describes some forces leading to improvements in cartographic techniques. - Statements are supported by some examples - Change over time is inferred through the use of examples - Some use of cartographic and geographic terms and concepts
4- 1	- Limited treatment of forces leading to improvements in cartographic techniques. - An argument whose structure lacks cohesion / integration. - Limited use cartographic and geographic terms and concepts

TASK 3: 3 marks for correct drawing on World Map and 2 marks for correct naming of symbol as the Star of David

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

Code Breaking

'Blinding ignorance does mislead us. O! Wretched mortals, open your eyes!'
Leonard da Vinci.

Team Number _____

General Instructions

- This task involves breaking 6 codes and in doing so reveal some famous ideas and quotes about perspective.
- Each code is worth 20 marks. A team representative may see the coordinator for a hint. Each hint will cost 4 marks.
- Perfection is an important part of code breaking. Ensure answers are presented in keeping with the way the code is presented.
- Where an image has been used, the source has been acknowledged in square brackets [ ]. These references are not part of the code.

Code 1:

T54 18 9, - o39 42 54 21 33 21 51 54 – s51 9 9 51 – t54 18 9 – d7 39 36 57 54 - b3 57 54 –
t54 18 9 - p42 9 51 51 21 33 21 51 54 - s51 9 9 51 – t54 18 9 – h18 39 30 9.
O30 51 5 1 48 - W63 21 30 7 9.

……

……

…….

Code 2:

Free hint:

19 6 14 26 13 8
8 22 22
4 19 26 7
7 19 22 2
4 26 13 7
7 12
8 22 22.

……

……

…….

……

……

…….

……

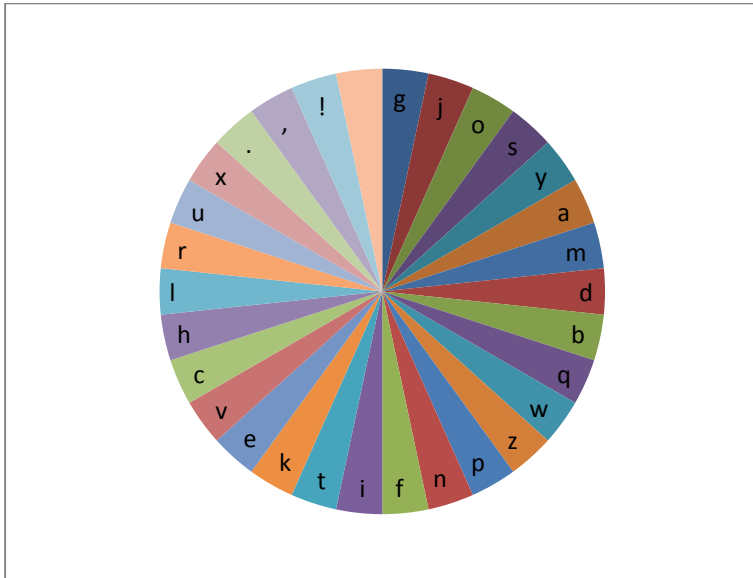**Code 3:**

Use this wheel to break the code that follows.

87, 184, 45, 200, 69, 164, 250, 220 │ 355 │ 268, 227, 158, 92, 40 │ 358 │
222, 161, 246, 255, 67, 163, 201, 77, 223, 164, 197 │ 352 │ 198, 30 │ 350 │
199, 258, 225 │ 351 │ 237, 186, 219, 130 │314

……

……

…….

Code 4:
On purchasing a safe, Mrs Yager had to program a code. She did this with colours. In case she forgot the exact order she wrote the following down to help her remember.

Crack the code to access Mrs Yager's safe. The first one to do so will get a prize from Mrs Yager. If you see her with the incorrect order you will be told so and this will count as a hint and 4 marks will be deducted.

Two men we**re** ar**g**uing a**b**out what colour a cHAmELeOn is. One said, "It is , <colour> I saw it on a tree a week ago, and I am sure of its colour**.**"
The other replie**d**, "No, I saw it on a leaf yesterday, and it was <colour>. I am sure about this."
As they debated, a third man overhea**r**d them and interjected, "I caught a ChAMeleoN yest**e**rday and **pu**t in this white box and I am sure that is <colour>. Take a **l**ook for you**r**self."
So the man o**p**ened his white box and al**l** thr**e**e were dismayed to see that th**e** cHAMeLEOn was <colour>!

As they stared at it the chamelEO**N** remarked – "sho**u**ld you really hold your opinions so tightly? All three of you were right, and all thr**e**e of you were wrong. It is just that you were looking at the situation from different perspectives.
[http://inspiringshortstories.org/it-is-all-about-perspective]

……………………………………………………………………………………………………

In no more than 100 words, describe how the code was broken.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

Code 5 – Identify the perspective in the photo by using the clues on the next page and the Minecraft Data Values.

[http://commons.wikimedia.org/wiki/File:Inside_Greenwich_Foot_Tunnel.jpg]

Icon	Dec	Hex	Block type
	0	0	Air
	1	1	Stone
	2	2	Grass Block
	3	3	Dirt
	4	4	Cobblestone
	5	5	Wood Planks ^{D}
	6	6	Saplings ^{DB}
	7	7	Bedrock
	8	8	Water ^{D}
	9	9	Stationary water ^{D}
	10	A	Lava ^{D}
	11	B	Stationary lava ^{D}
	12	C	Sand
	13	D	Gravel
	14	E	Gold Ore
	15	F	Iron Ore

Icon	Dec	Hex	Block type
	16	10	Coal Ore
	17	11	Wood ^{DB}
	18	12	Leaves ^{DB}
	19	13	Sponge
	20	14	Glass
	21	15	Lapis Lazuli Ore
	22	16	Lapis Lazuli Block
	23	17	Dispenser ^{DT}
	24	18	Sandstone ^{D}
	25	19	Note Block ^{T}
	26	1A	Bed ^{DI}

[http://www.minecraftwiki.net/wiki/Data_values]

bedrock	
leaves	
stone	
coal ore	
water	
stationary water	
Dirt	
stone	
sand	

stationary lava	
Lapis lazuli block	
9	
8	
B	
16	
sandstone	
bedrock	
leaves	
5	
16	

……

Code 6:

Character keys	Enter and editing keys	Navigation keys	Numeric keypad
Modifier keys	System and GUI keys	Function keys	Lock keys

[Keyboard image from http://commons.wikimedia.org/wiki/File:ISO_keyboard_(105)_QWERTY_UK.svg]

8L, 7L – 7L2D, 9L1D, 4L2D, - 7L2D, 1L, 3L2D, P , 1L1D, 9L1D, 2L, 4L2D

6R, 2U3R, 4R, 1U1R, 2U7R, 1U2R, 4R2U, - 5R2U, 10R2U, 1U2R, 1U3R1U, - 1D3R, 2U7R, 1U2R, 7R1U, 1D2R3U2R, 3R1U, - 7R1U, 1U1R, v, e, -

  [image from http://commons.wikimedia.org/wiki/File:Latin_alphabet_%C3%9E%C3%BE.svg]

or – rejoice because [↔]

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

EXCITE · CHALLENGE · ENRICH

Code Breaking

SOLUTIONS

'Blinding ignorance does mislead us. O! Wretched mortals, open your eyes!'
Leonard da Vinci.

Team Number   _____

General Instructions

- This task involves breaking 6 codes and in doing so reveal some famous ideas and quotes about perspective.
- Each code is worth 20 marks. A team representative may see the coordinator for a hint. Each hint will cost 4 marks.
- Perfection is an important part of code breaking. Ensure answers are presented in keeping with the way the code is presented.
- Where an image has been used, the source has been acknowledged in square brackets [ ]. These references are not part of the code.

Code 1:

T54 18 9, - o39 42 54 21 33 21 51 54 – s51 9 9 51 – t54 18 9 – d7 39 36 57 54 - b3 57 54 –
t54 18 9 - p42 9 51 51 21 33 21 51 54 - s51 9 9 51 – t54 18 9 – h18 39 30 9.
O30 51 5 1 48 - W63 21 30 7 9.

A	B	C	D	E	F	G	H	I	J
1	3	5	7	9	11	15	18	21	24
K	L	M	N	O	P	Q	R	S	T
27	30	33	36	39	42	45	48	51	54
U	V	W	X	Y	Z				
57	60	63	66	69	72				

The optimist sees the donut but the pessimist sees the hole.

[Oscar Wilde]

Code 2:

19 6 14 26 13 8
8 22 22
4 19 26 7
7 19 22 2
4 26 13 7
7 12
8 22 22.

Free hint:
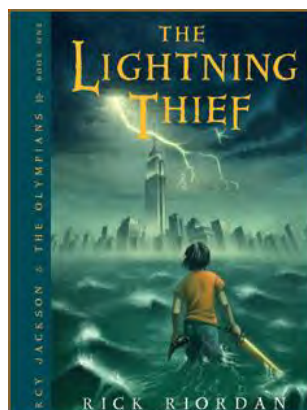
A	B	C	D	E	F	G	H	I	J
26	25	24	23	22	21	20	19	18	17
K	L	M	N	O	P	Q	R	S	T
16	15	14	13	12	11	10	9	8	7
U	V	W	X	Y	Z				
6	5	4	3	2	1				

humans
see
what
they
want
to
see

Code 3:

Use this wheel to break the code that follows.
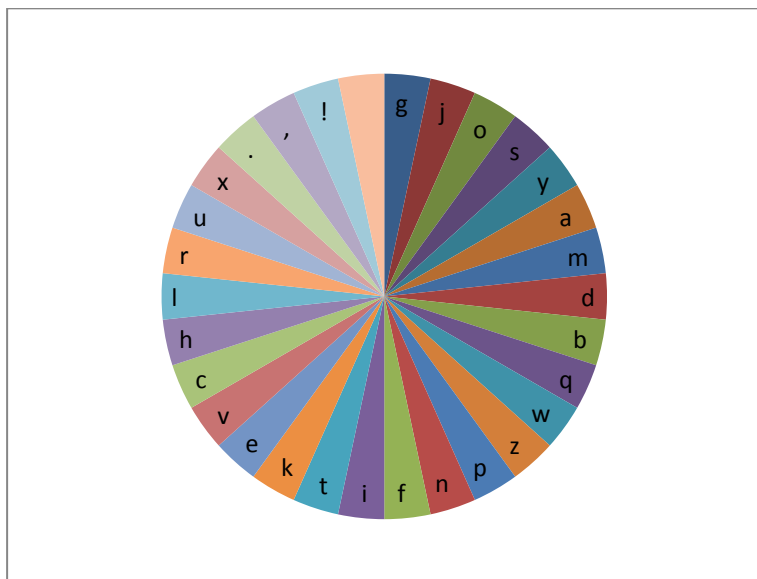
87, 184, 45, 200, 69, 164, 250, 220 │ 355 │ 268, 227, 158, 92, 40 │ 358 │
222, 161, 246, 255, 67, 163, 201, 77, 223, 164, 197 │ 352 │ 198, 30 │ 350 │
199, 258, 225 │ 351 │ 237, 186, 219, 130 │314

Degrees	Letter	Degrees	Letter	Degrees	Letter	Degrees	Letter
1-12	G	97-108	B	193-204	T	289-300	U
13-24	J	109-120	Q	205-216	K	301-312	X
25-36	O	212-132	W	217-228	E	313-324	.
37-48	S	133-144	Z	229-240	V	325-336	,
49-60	Y	145-156	P	241-252	C	337-348	!
61-72	A	157-168	N	253-264	H	349-360	space
73-84	M	169-180	F	265-276	L		
85-96	D	181-192	I	277-288	R		

Distance lends enchantment to the view

Code 4:
On purchasing a safe, Mrs Yager had to program a code. She did this with colours. In case she forgot the exact order she wrote the following down to help her remember.

Crack the code to access Mrs Yager's safe. The first one to do so will get a prize from Mrs Yager. If you see her with the incorrect order you will be told so and this will count as a hint and 4 marks will be deducted.

Two men we**re** ar**g**uing a**b**out what colour a cHAmELeOn is. One said, "It is , <colour> I saw it on a tree a week ago, and I am sure of its colour**.**"
The other replie**d**, "No, I saw it on a leaf yesterday, and it was <colour>. I am sure about this."
As they debated, a third man overhea**r**d them and interjected, "I caught a ChAMeleoN yest**e**rday and **pu**t in this white box and I am sure that is <colour>. Take a **l**ook for you**r**self."
So the man o**p**ened his white box and a**ll** thr**ee** were dismayed to see that th**e** cHAMeLEOn was <colour>!

As they stared at it the chamelEO**N** remarked – "sho**u**ld you really hold your opinions so tightly? All three of you were right, and all thr**ee** of you were wrong. It is just that you were looking at the situation from different perspectives.
[http://inspiringshortstories.org/it-is-all-about-perspective]

Green, blue, purple, red

In no more than 100 words, describe how the code was broken.

- **By combining the letters underlined the same way, the spelling of each colour is derived.**
- **Each time Chameleon is mentioned there are letters in capitals. The number of letters corresponds to the number of letters in the colour. So the first one has 5 capitals and only green has 5 letters so it is the first colour.**

Code 5 – Identify the perspective in the photo by using the clues on the next page and the Minecraft Data Values.

[http://commons.wikimedia.org/wiki/File:Inside_Greenwich_Foot_Tunnel.jpg]

Icon	Dec	Hex	Block type
	0	0	Air
	1	1	Stone
	2	2	Grass Block
	3	3	Dirt
	4	4	Cobblestone
	5	5	Wood Planks D
	6	6	Saplings D B
	7	7	Bedrock
	8	8	Water D
	9	9	Stationary water D
	10	A	Lava D
	11	B	Stationary lava D
	12	C	Sand
	13	D	Gravel
	14	E	Gold Ore
	15	F	Iron Ore

Icon	Dec	Hex	Block type
	16	10	Coal Ore
	17	11	Wood D B
	18	12	Leaves D B
	19	13	Sponge
	20	14	Glass
	21	15	Lapis Lazuli Ore
	22	16	Lapis Lazuli Block
	23	17	Dispenser D T
	24	18	Sandstone D
	25	19	Note Block T
	26	1A	Bed D I

[http://www.minecraftwiki.net/wiki/Data_values]

bedrock	G
leaves	R
stone	A
coal ore	P
water	H
stationary water	I
Dirt	C
stone	A
sand	L

stationary lava	P
Lapis lazuli block	E
9	R
8	S
B	P
16	E
sandstone	C
bedrock	T
leaves	I
5	V
16	E

graphical perspective

There are 26 entries
The word graphical is derived by using the first column (dec) in order
The word perspective is derived by using the second (hex) and third (block type) in reverse order.

Code 6:

[Keyboard image from http://commons.wikimedia.org/wiki/File:ISO_keyboard_(105)_QWERTY_UK.svg]

8L, 7L – 7L2D, 9L1D, 4L2D, - 7L2D, 1L, 3L2D, **P** , 1L1D, 9L1D, 2L, 4L2D

 6R, 2U3R, 4R, 1U1R, 2U7R, 1U2R, 4R2U, - 5R2U, 10R2U, 1U2R, 1U3R1U, - 1D3R, 2U7R, 1U2R, 7R1U, 1D2R3U2R, 3R1U, - 7R1U, 1U1R, v, e, -

    [image from http://commons.wikimedia.org/wiki/File:Latin_alphabet_%C3%9E%C3%BE.svg]

or – rejoice because [↔]

We can complain because rose bushes have thorns or rejoice because thorn bushes have roses.

On the first line the codes are based on the letter p on the keyboard.
On the second line the codes are based on the up arrow key

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

Creative Producers

'The Medici made me and the Medici destroyed me' Leonardo da Vinci.

Team Number _____

Creative Producers

Background Information

Leonardo da Vinci stated ominously *'The Medici made me and the Medici destroyed me.'* He enjoyed the patronage of Lorenzo de Medici but this cryptic comment that he wrote in the margin of his notebook has puzzled historians in modern times. Lorenzo certainly supported and admired Leonardo, so why did Leonardo use the emotively charged word 'destroyed'? It is claimed that Leonardo died at Clos Luce on May 2nd in the arms of the King of France.

The Task: Death in a Minute

Imagine that Leonardo's death was suspicious. What could Leonardo have discovered or invented that would trigger his murder? He was a military engineer who designed innovative bridges and war machines, and he was brilliant at creating detailed maps of cities. Could this have been why he died? Or was it because Lorenzo was bitter when Leonardo who created his weapons of war told him that he was leaving his service to go to Milan?

In **60 seconds** create a dramatic performance that focuses on the mystery of Leonardo's death and why he was killed. You must incorporate Leonardo's cryptic note: *'The Medici made me and the Medici destroyed me.'* It can be a serious dramatic piece or comedic. Please consider the essential performance elements of role, voice, space and physical movement. Each group will have **ten minutes** to prepare for the **60-second** performance. A warning will be given at **55 seconds** and the presentation will be stopped at **60 seconds**.

Marking Criteria

You will be marked on the basis of the following criteria:
- 🐾 Physicality and voice   /10
- 🐾 Coherence – structure   /10
- 🐾 Dramatic communication of ideas   /10
- 🐾 Flair and originality   /10
- 🐾 Content   /10

Marking Grid

Criteria	Skilful 9-10	Effective 8-7	Sound 6-4	Limited 3-0
Physicality and voice				
Coherence – structure				
Dramatic communication of ideas				
Flair and originality				
Content				
				/50

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

Engineering Challenge

*'I have been impressed with the urgency of doing. Knowing is not enough; we must apply.
Being willing is not enough; we must do'* Leonardo da Vinci.

Team Number _____

Discovery

"Discovery consists of seeing what everybody has seen and thinking what nobody has thought"
(Albert von Szent-Györgyi 'The Scientist Speculates').

The Task

📧 You will have 40 minutes to complete this task and then you will be asked to take your structure to the marking area.

Background

In 1502 Leonardo da Vinci produced a drawing of a single-span 240-metre bridge over the Golden Horn, an estuary dividing the city of Istanbul *(previously Constantinople)* in Turkey. This was part of a civil engineering project for Sultan Bayezid II.

Leonardo's drawings and notes regarding this bridge are shown below and are currently displayed at the *Museo della Scienza e della Tecnologia* in Milan, Italy.
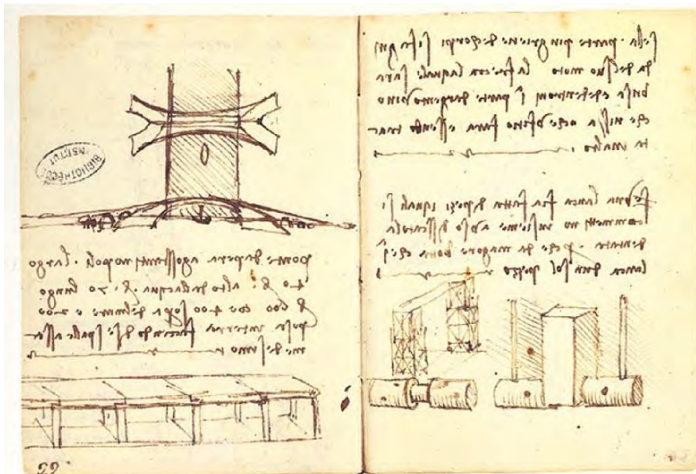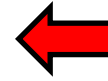

Golden Horn Bridge designed by Leonardo da Vinci in 1502

I, your faithful servant, understand that it has been your intention to erect a bridge from Galata to Stambul..." With these words Leonardo described in a letter to Sultan Bayezid II how he would build the greatest single span bridge of the ancient world.

The Sultan remained unconvinced and the bridge was **not built**. After the letter was **discovered** in the national archives in Istanbul in 1952, the possibility of realising Leonardo's bridge has been the subject of much analysis. But whether Leonardo was saved from disaster or deprived of the legacy of being the greatest bridge builder of his time, the "Golden Horn" Bridge design is an eloquent synthesis of form and function typical of his universal thinking.

(Partial source: Bulent Atalay, "Math and the Mona Lisa." www.bulentatalay.com)

The vision of Leonardo's Golden Horn Bridge was re-discovered in 2001, when a small footbridge based on Leonardo's design was constructed near Ås in Norway.

The Leonardo da Vinci inspired footbridge at Ås in Norway

Design Statement

📧 You are to design and construct a model inspired by the re-discovered design drawings from Leonardo's proposed Golden Horn bridge design.

📧 The *bridge structure* should be inspired by the da Vinci design and be a single span bridge.
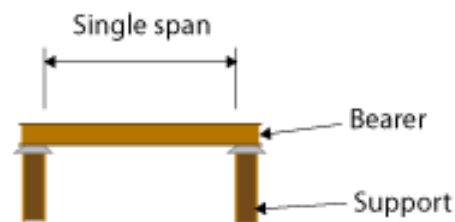
Design Parameters

📧 You will have **forty minutes** to design and construct the *Bridge model*.

📧 The *Bridge model* will be marked according to its ability to:

- Maintain itself as a free standing structure
- Span a large distance
- Demonstrate inspiration based on the Golden Horn bridge design through the design analysis and evidence from the bridge model

Material Limitations

- 📧 2 sheets of A4 paper
- 📧 4 straws
- 📧 100mm of masking tape

Testing Conditions

- 📧 Your *bridge model* must be able to remain upright during the testing.
- 📧 It will be measured for the span.
- 📧 Demonstrate creativity and a link to the Golden Horn bridge design through your written analysis and evidence from your final bridge design model.

Design Analysis

1. Explain how features of your bridge have been inspired from the re-discovered original da Vinci Golden Horn Bridge design.

Marking Grid

Criteria	Marks	Total
Free standing (marks only awarded if bridge remains standing	5	
Span of bridge	1 mark for every 2 centimetres	
Creativity and link to original da Vinci Golden Horn Bridge	10 9 8 7 6 5 4 3 2 1	
Quality of explanation for design analysis	10 9 8 7 6 5 4 3 2 1	

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

English Challenge

'Knowing is not enough; we must apply. Being willing is not enough; we must do' Leonard da Vinci.

Team Number _____

Activity 1: Spelling (10 marks)

Ten words will be read out to you. Please write your answers on the spelling sheet provided.

Activity 2: Discovery match-up (10 marks)

Match the character from a novel or a myth with his or her discovery.

Character	Discovery
	books
	courage
	Golden Fleece
	White Rabbit
	vanity and death
	Big Brother
	ducks
	Lilliputians
	Moby Dick
	egg

Discovery Match-Up:

1. Alice
2. Gulliver
3. Jason
4. Eragon
5. Ahab
6. Dorian Gray
7. Winston Smith
8. Holden Caulfield
9. Liesel Meminger
10. Katniss Everdeen

Activity 3: Analysing an extract from *The Lord of the Rings: The Return of the King* - Tolkien (10 marks)

Sam was looking at Orodruin, the Mountain of Fire. Ever and anon the furnaces far below its ashen cone would grow hot and with a great surging and throbbing pour forth rivers of molten rock from chasms in its sides. Some would flow blazing towards Barad-dûr down great channels; some would wind their way into the stony plain, until they cooled and lay like twisted dragon-shapes vomited from the tormented earth. In such an hour of labour Sam beheld Mount Doom, and the light of it, cut off by the high screen of the Ephel Dúath from

those who climbed up the path from the West, now glared against the stark rock faces, so that they seemed to be drenched with blood.

In that dreadful light Sam stood aghast, for now, looking to his left, he could see the Tower of Cirith Ungol in all its strength. The horn that he had seen from the other side was only its topmost turret. Its eastern face stood up in three great tiers from a shelf in the mountain-wall far below; its back was to a great cliff behind, from which it jutted out in pointed bastions, one above the other, diminishing as they rose, with sheer sides of cunning masonry that looked north-east and south-east. About the lowest tier, two hundred feet below where Sam now stood, there was a battlemented wall enclosing a narrow court. Its gate, upon the near south-eastern side, opened on a broad road, the outer parapet of which ran upon the brink of a precipice, until it turned southward and went winding down into the darkness to join the road that came over the Morgul Pass. Then on it went through a jagged rift in the Morgai out into the valley of Gorgoroth and away to Barad-dûr. The narrow upper way on which Sam stood leapt swiftly down by stair and steep path to meet the main road under the frowning walls close to the Tower-gate.

As he gazed at it suddenly Sam understood, almost with a shock, that this stronghold had been built not to keep enemies out of Mordor, but to keep them in. It was indeed one of the works of Gondor long ago, an eastern outpost of the defences of Ithilien, made when, after the Last Alliance, Men of Westernesse kept watch on the evil land of Sauron where his creatures still lurked. But as with Narchost and Carchost, the Towers of the Teeth, so here too the vigilance had failed, and treachery had yielded up the Tower to the Lord of the Ringwraiths, and now for long years it had been held by evil things. Since his return to Mordor, Sauron had found it useful; for he had few servants but many slaves of fear, and still its chief purpose as of old was to prevent escape from Mordor. Though if an enemy were so rash as to try to enter that land secretly, then it was also a last unsleeping guard against any that might pass the vigilance of Morgul and of Shelob.

Only too clearly Sam saw how hopeless it would be for him to creep down under those many-eyed walls and pass the watchful gate. And even if he did so, he could not go far on the guarded road beyond: not even the black shadows, lying deep where the red glow could not reach, would shield him long from the night-eyed orcs. But desperate as that road might be, his task was now far worse: not to avoid the gate and escape, but to enter it, alone.

His thought turned to the Ring, but there was no comfort there, only dread and danger. No sooner had he come in sight of Mount Doom, burning far away, than he was aware of a change in his burden. As it drew near the great furnaces where, in the deeps of time, it had been shaped and forged, the Ring's power grew, and it became more fell, untameable save by some mighty will. As Sam stood there, even though the Ring was not on him but hanging by its chain about his neck, he felt himself enlarged, as if he were robed in a huge distorted shadow of himself, a vast and ominous threat halted upon the walls of Mordor. He felt that he had from now on only two choices: to forbear the Ring, though it would torment him; or to claim it, and challenge the Power that sat in its dark hold beyond the valley of shadows. Already the Ring tempted him, gnawing at his will and reason. Wild fantasies arose in his mind; and he saw Samwise the Strong, Hero of the Age, striding with a flaming sword across the darkened land, and armies flocking to his call as he marched to the overthrow of Barad-dûr. And then all the clouds rolled away, and the white sun shone, and at his command the vale of Gorgoroth became a garden of flowers and trees and brought forth fruit. He had only to put on the Ring and claim it for his own, and all this could be.

Questions

1. What does Sam discover that fills him with dread? (1 mark)

……

……

……

2. How does Tolkien use language to convey Sam's fear? Refer to three language techniques and describe how they convey his fear. (6 marks)

a. ……………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

b. ……………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

c. ……………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

3. What does the Ring symbolise, and how have you arrived at this conclusion? (3 marks)

……

……

……

……

……

……

……

……

……

Activity 4: Analysing a mash-up poem 'The Cento' (17 marks)

Cento (Latin for Mash-up)

(A mash-up of lines by John Keats, Arthur O' Shaughnessy, James Elroy Flecker, Walter Savage Landor, Percy Bysshe Shelley, Alfred Lord Tennyson and Alison Chisholm.)

Much have I travelled in the realms of gold,
And many goodly states and kingdoms seen,
But still I long to learn tales, marvelous tales,
Of ships and stars and isles where good men rest,
How others fought to forge my world.
What mad pursuit? What struggle to escape? What wild ecstasy?

We are the music-makers,
And we are the dreamers of dreams,
Step forward,
To feel the blood run through the veins and tingle
Where busy thought and blind sensation mingle.

Come, my friends, 'tis not too late,
For we are the movers and shakers
Of the world for ever, it seems;
To strive, to seek, to find and not to yield.

Questions:

1. How does the poem convey humanity's curiosity and drive to discover new things through language features? Refer to three language features and how they convey this. (6 marks)

   a. ……………………………………………………………………………………………
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………

   b. ……………………………………………………………………………………………
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………

   c. ……………………………………………………………………………………………
   ………………………………………………………………………*Task developed Karen Yager, Knox Grammar,*……
   ……………………………………………………………………………………………

2. Create an original canto of 10 lines that 'steals' lines from a range of texts, such as Shakespeare's plays, poetry, songs and films. Identify beside each line the source. Your canto must convey an important message about **self-discovery**. (12 marks)

Lines of the Canto	Source

Marking Grid

Criteria	Marks				
10 lines	0	1			
Identifies the sources of each line	0	1			
A clever and cohesive mash-up of the lines	1	2	3	4	5
An important message about self-discovery	1	2	3	4	5
	TOTAL		**/12**		

Activity 5: Analysing the *Lord of the Rings* Poster (8 marks)

Identify **four** ways that the concept of discovery is conveyed to the viewer and explain why how they do this.

Visual Techniques	How they convey the concept of Discovery

Activity 6: Analysing Sir Ernest Shackleton's *South!* (10 marks)

Thus, after a year's incessant battle with the ice, we had returned, by many strange turns of fortune's wheel, to almost identically the same latitude that we had left with such high hopes and aspirations twelve months previously; but under what different conditions now! Our ship crushed and lost, and we ourselves drifting on a piece of ice at the mercy of the winds. However, in spite of occasional setbacks due to unfavourable winds, our drift was in the main very satisfactory, and this went a long way towards keeping the men cheerful.

As the drift was mostly affected by the winds, the weather was closely watched by all, and Hussey, the meteorologist, was called upon to make forecasts every four hours, and some times more frequently than that. A meteorological screen, containing thermometers and a barograph, had been erected on a post frozen into the ice, and observations were taken every four hours. When we first left the ship the weather was cold and miserable, and altogether as unpropitious as it could possibly have been for our attempted march. Our first few days at Ocean Camp were passed under much the same conditions. At nights the temperature dropped to zero, with blinding snow and drift. One-hour watches were instituted, all hands taking their turn, and in such weather this job was no sinecure. The watchman had to be continually on the alert for cracks in the ice, or any sudden changes in the ice conditions, and also had to keep his eye on the dogs who often became restless, fretful, and querulous in the early hours of the morning. At the end of his hour he was very glad to crawl back into the comparative warmth of his frozen sleeping-bag.

Questions:

1. Provide a **synonym** for the following words from the extract: (4 marks)

a. Incessant: _____

b. Unpropitious: _____

c. Sinecure: _____

d. Querulous: _____

2. How does Shackleton convey the arduous and difficult journey of discovery in such an inhospitable place? Refer to **three** language features and explain **how** and **why** they capture the challenges and difficulties. (6 marks)

a. ………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

b. ………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

c. ………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

8

Activity 7: Micro-story of Discovery (20 marks)

When people travel they often make extraordinary discoveries. Compose a 50-word micro-story about a journey of discovery. It could be a journey to a new planet, a strange and mysterious island or to the depths of the ocean. The possibilities are endless! The wonder and excitement of the discovery must be palpable. However, there must be a suggestion that the discovery could have challenging consequences and lead to a significant realisation.

The micro-story must include the following ingredients:
    a. 50 words only!
    b. A clever title that includes a pun!
    c. An engaging and vivid description of the place.
    d. The descriptions and the verbs must convey the joy and excitement.
    e. An important message about the challenges of discovery.
    f. Onomatopoeia: (Provide the example from your
        story) …………………………………………………………………….
    g. Personification: (Provide the example from your
        story) …………………………………………………………………….

Marking Grid

Ingredients	Marks
50 words	0 1
A clever title that includes a pun.	0 1 2
An engaging and vivid description of the place.	1 2 3 4 5
The descriptions and the verbs must convey the joy and excitement.	1 2 3 4 5
An important message about the challenges of discovery.	1 2 3 4 5
Onomatopoeia	0 1
Personification	0 1
TOTAL	**/20**

Title:…………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

………………………………………………………………………*Task developed Karen Yager*………

……………………………………………………………………………………………………

………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………

10

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

EXCITE
ENRICH
CHALLENGE

English Challenge Solutions

'Knowing is not enough; we must apply. Being willing is not enough; we must do' Leonard da
Vinci.

Team Number   _____

Activity 1: Spelling (10 marks)

Ten words will be read out to you. Please write your answers on the spelling sheet provided.

Activity 2: Discovery match-up (10 marks)

Match the character from a novel or a myth with his or her discovery.

Character	Discovery
Liesel Meminger	books
Katniss Everdeen	courage
Jason	Golden Fleece
Alice	White Rabbit
Dorian Gray	vanity and death
Winston Smith	Big Brother
Holden Caulfield	ducks
Gulliver	Lilliputians
Ahab	Moby Dick
Eragon	egg

Discovery Match-Up:

1. Alice
2. Gulliver
3. Jason
4. Eragon
5. Ahab
6. Dorian Gray
7. Winston Smith
8. Holden Caulfield
9. Liesel Meminger
10. Katniss Everdeen

Activity 3: Analysing an extract from *The Lord of the Rings: The Return of the King* - Tolkien (10 marks)

Sam was looking at Orodruin, the Mountain of Fire. Ever and anon the furnaces far below its ashen cone would grow hot and with a great surging and throbbing pour forth rivers of molten rock from chasms in its sides. Some would flow blazing towards Barad-dûr down great channels; some would wind their way into the stony plain, until they cooled and lay like twisted dragon-shapes vomited from the tormented earth. In such an hour of labour Sam beheld Mount Doom, and the light of it, cut off by the high screen of the Ephel Dúath from

those who climbed up the path from the West, now glared against the stark rock faces, so that they seemed to be drenched with blood.

In that dreadful light Sam stood aghast, for now, looking to his left, he could see the Tower of Cirith Ungol in all its strength. The horn that he had seen from the other side was only its topmost turret. Its eastern face stood up in three great tiers from a shelf in the mountain-wall far below; its back was to a great cliff behind, from which it jutted out in pointed bastions, one above the other, diminishing as they rose, with sheer sides of cunning masonry that looked north-east and south-east. About the lowest tier, two hundred feet below where Sam now stood, there was a battlemented wall enclosing a narrow court. Its gate, upon the near south-eastern side, opened on a broad road, the outer parapet of which ran upon the brink of a precipice, until it turned southward and went winding down into the darkness to join the road that came over the Morgul Pass. Then on it went through a jagged rift in the Morgai out into the valley of Gorgoroth and away to Barad-dûr. The narrow upper way on which Sam stood leapt swiftly down by stair and steep path to meet the main road under the frowning walls close to the Tower-gate.

As he gazed at it suddenly Sam understood, almost with a shock, that this stronghold had been built not to keep enemies out of Mordor, but to keep them in. It was indeed one of the works of Gondor long ago, an eastern outpost of the defences of Ithilien, made when, after the Last Alliance, Men of Westernesse kept watch on the evil land of Sauron where his creatures still lurked. But as with Narchost and Carchost, the Towers of the Teeth, so here too the vigilance had failed, and treachery had yielded up the Tower to the Lord of the Ringwraiths, and now for long years it had been held by evil things. Since his return to Mordor, Sauron had found it useful; for he had few servants but many slaves of fear, and still its chief purpose as of old was to prevent escape from Mordor. Though if an enemy were so rash as to try to enter that land secretly, then it was also a last unsleeping guard against any that might pass the vigilance of Morgul and of Shelob.

Only too clearly Sam saw how hopeless it would be for him to creep down under those many-eyed walls and pass the watchful gate. And even if he did so, he could not go far on the guarded road beyond: not even the black shadows, lying deep where the red glow could not reach, would shield him long from the night-eyed orcs. But desperate as that road might be, his task was now far worse: not to avoid the gate and escape, but to enter it, alone.

His thought turned to the Ring, but there was no comfort there, only dread and danger. No sooner had he come in sight of Mount Doom, burning far away, than he was aware of a change in his burden. As it drew near the great furnaces where, in the deeps of time, it had been shaped and forged, the Ring's power grew, and it became more fell, untameable save by some mighty will. As Sam stood there, even though the Ring was not on him but hanging by its chain about his neck, he felt himself enlarged, as if he were robed in a huge distorted shadow of himself, a vast and ominous threat halted upon the walls of Mordor. He felt that he had from now on only two choices: to forbear the Ring, though it would torment him; or to claim it, and challenge the Power that sat in its dark hold beyond the valley of shadows. Already the Ring tempted him, gnawing at his will and reason. Wild fantasies arose in his mind; and he saw Samwise the Strong, Hero of the Age, striding with a flaming sword across the darkened land, and armies flocking to his call as he marched to the overthrow of Barad-dûr. And then all the clouds rolled away, and the white sun shone, and at his command the vale of Gorgoroth became a garden of flowers and trees and brought forth fruit. He had only to put on the Ring and claim it for his own, and all this could be.

Questions

1. What does Sam discover that fills him with dread? (1 mark)

He dreaded entering on his own the gates of the Tower of Cirith Ungol.

2. How does Tolkien use language to convey Sam's fear? Refer to three language techniques and describe how they convey his fear. (6 marks)
   - Emotive words: tormented, dreadful, aghast, ominous, dread, danger, etc.
   - Alliteration: 'dread and danger'; 'twisted….tormented'
   - Disjunction: 'but'
   - Personification: 'frowning walls'

3. What does the Ring symbolise, and how have you arrived at this conclusion? (3 marks)

Unlimited power and strength – as long as a good reason is supplied.

Activity 4: Analysing a mash-up poem 'The Cento' (17 marks)

Cento (Latin for Mash-up)

(A mash-up of lines by John Keats, Arthur O' Shaughnessy, James Elroy Flecker, Walter Savage Landor, Percy Bysshe Shelley, Alfred Lord Tennyson and Alison Chisholm.)

Much have I travelled in the realms of gold,
And many goodly states and kingdoms seen,
But still I long to learn tales, marvelous tales,
Of ships and stars and isles where good men rest,
How others fought to forge my world.
What mad pursuit? What struggle to escape? What wild ecstasy?

We are the music-makers,
And we are the dreamers of dreams,
Step forward,
To feel the blood run through the veins and tingle
Where busy thought and blind sensation mingle.

Come, my friends, 'tis not too late,
For we are the movers and shakers
Of the world for ever, it seems;
To strive, to seek, to find and not to yield.

Questions:

1. How does the poem convey humanity's curiosity and drive to discover new things through language features? Refer to three language features and how they convey this. (6 marks)

   a. Adjective – 'marvellous'
   b. Alliteration – 'long to learn'
   c. Rhetorical questions – 'What mad pursuit? What struggle to escape? What wild ecstasy?'
   d. Accumulation – 'Of ships and stars and isles where good men rest'
   e. Imperative voice – 'Come…'

2. Create an original canto of 10 lines that 'steals' lines from a range of texts, such as Shakespeare's plays, poetry, songs and films. Identify beside each line the source. Your canto must convey an important message about **self-discovery**. (12 marks)

Lines of the Canto	Source

Marking Grid

Criteria	Marks				
10 lines	0	1			
Identifies the sources of each line	0	1			
A clever and cohesive mash-up of the lines	1	2	3	4	5
An important message about self-discovery	1	2	3	4	5
TOTAL	**/12**				

Activity 5: Analysing the *Lord of the Rings* Poster (8 marks)

Identify **four** ways that the concept of discovery is conveyed to the viewer and explain why how they do this.

Visual Techniques	How they convey the concept of Discovery
Gaze	Eyes looking out of the frame, etc.
Framing	Characters framed around the scene suggesting travel and discovery; ring in centre
Light and colour	The light reflected on the faces and the ring
symbolism	The ring suggesting symbolically discovery.

Activity 6: Analysing Sir Ernest Shackleton's *South!* (10 marks)

Thus, after a year's **incessant** battle with the ice, we had returned, by many strange turns of fortune's wheel, to almost identically the same latitude that we had left with such high hopes and aspirations twelve months previously; but under what different conditions now! Our ship crushed and lost, and we ourselves drifting on a piece of ice at the mercy of the winds. However, in spite of occasional setbacks due to unfavourable winds, our drift was in the main very satisfactory, and this went a long way towards keeping the men cheerful.

As the drift was mostly affected by the winds, the weather was closely watched by all, and Hussey, the meteorologist, was called upon to make forecasts every four hours, and some times more frequently than that. A meteorological screen, containing thermometers and a barograph, had been erected on a post frozen into the ice, and observations were taken every four hours. When we first left the ship the weather was cold and miserable, and altogether as **unpropitious** as it could possibly have been for our attempted march. Our first few days at Ocean Camp were passed under much the same conditions. At nights the temperature dropped to zero, with blinding snow and drift. One-hour watches were instituted, all hands taking their turn, and in such weather this job was no **sinecure**. The watchman had to be continually on the alert for cracks in the ice, or any sudden changes in the ice conditions, and also had to keep his eye on the dogs who often became restless, fretful, and **querulous** in the early hours of the morning. At the end of his hour he was very glad to crawl back into the comparative warmth of his frozen sleeping-bag.

Questions:

1. Provide a **synonym** for the following words from the extract: (4 marks)

   a. Incessant: continual, non-stop

   b. Unpropitious: unfavourable

   c. Sinecure: easy job

   d. Querulous: negative, complaining

2. How does Shackleton convey the arduous and difficult journey of discovery in such an inhospitable place? Refer to **three** language features and explain **how** and **why** they capture the challenges and difficulties. (6 marks)

   a. Emotive language: 'crushed and lost'
   b. Personification: 'mercy of the winds'
   c. Adjectives: 'cold and miserable'

Activity 7: Micro-story of Discovery (20 marks)

When people travel they often make extraordinary discoveries. Compose a 50-word micro-story about a journey of discovery. It could be a journey to a new planet, a strange and mysterious island or to the depths of the ocean. The possibilities are endless! The wonder and excitement of the discovery must be palpable. However, there must be a suggestion that the discovery could have challenging consequences and lead to

a significant realisation.

The micro-story must include the following ingredients:
  a. 50 words only!
  b. A clever title that includes a pun! (Play on words)
  c. An engaging and vivid description of the place.
  d. The descriptions and the verbs must convey the joy and excitement.
  e. An important message about the challenges of discovery.
  f. Onomatopoeia (echoes sound it represents. E.g. splash) (Provide the example from your story) …………………………………………………………………………….
  g. Personification (Human qualities to non-human): (Provide the example from your story) …………………………………………………………………………….

Marking Grid

Ingredients	Marks
50 words	0 1
A clever title that includes a pun.	0 1 2
An engaging and vivid description of the place.	1 2 3 4 5
The descriptions and the verbs must convey the joy and excitement.	1 2 3 4 5
An important message about the challenges of discovery.	1 2 3 4 5
Onomatopoeia	0 1
Personification	0 1
TOTAL	**/20**

Title:……………………………………………………………

VIRILE AGITUR

International da Vinci Decathlon

Celebrating the Academic Gifts of International Youth

EXCITE · CHALLENGE · ENRICH

General Knowledge

'Art is never finished, only abandoned' Leonardo da Vinci.

Team Number _____

1. Renaissance Questions (10 marks)

2. Considered to be the first humanist and Renaissance man	
3. Twice written manuscripts were called this	
4. Considered the Godfather of the Renaissance, he was born in Florence.	
5. This invention spread the humanist ideas wider and improved communication.	
6. This new aspect to painting rendered art more realistic.	
7. Said to be one of the greatest Renaissance architects.	
8. This is the Italian name for rebirth.	
9. A famous seer whose prophesies about the world's fate still resonates today.	
10. This man dropped different-sized cannonballs from the top of a building to prove that all objects fell at the same rate of acceleration.	
11. The birthplace of the Renaissance.	

2. Leonardo da Vinci's Inventions (10 marks)
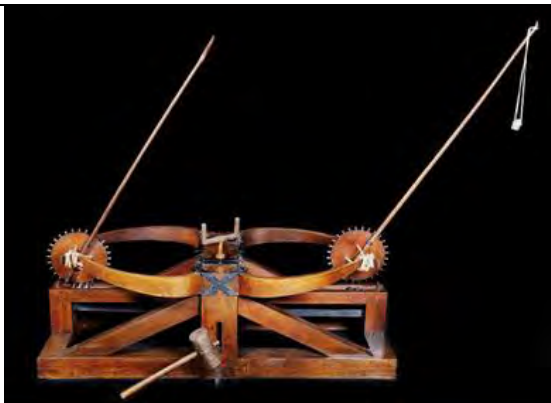
What were these inventions to be used for?

3. Leonardo's sketches (6 marks)

Find **three** of Leonardo's sketches and explain why they are significant for their time and today in 20 words maximum.

a.

b.

c.

4. Leonardo da Vinci's Horses (10 marks)

Questions	Answers
Leonardo loved to draw horses and he had an ambitious plan to make a sculpture of a horse. Who commissioned this work?	
What was to be so special about this horse?	
Who destroyed the clay model built by Leonardo?	
How and why does this sketch reflect the renaissance?	
What was the Italian name for the proposed sculpture?	

5. The Last Supper (10 marks)
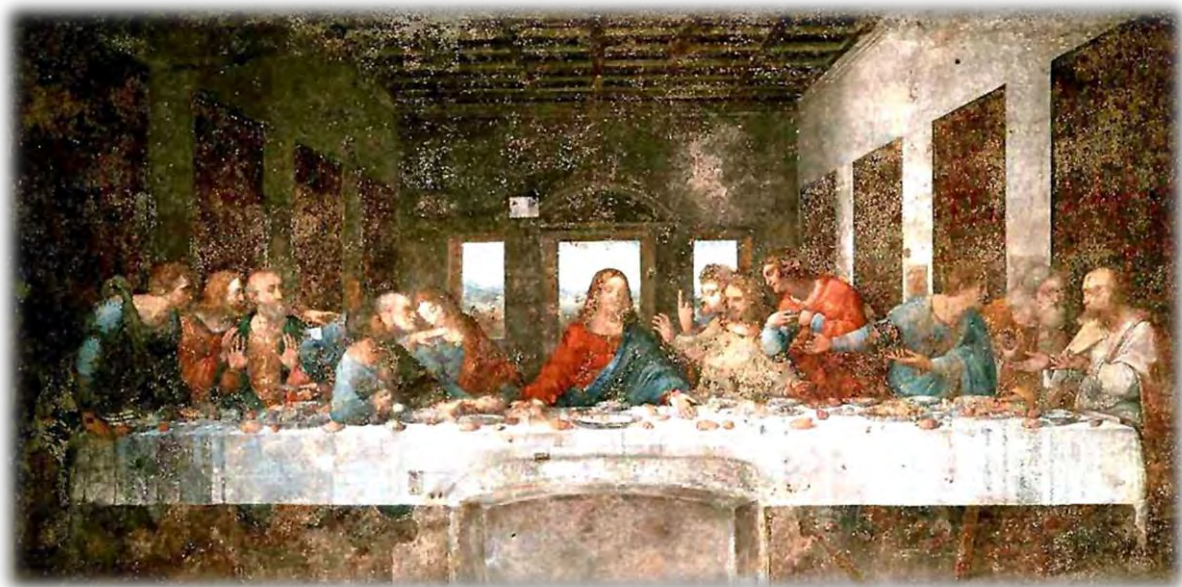
Question	Answer
Where is the original painting to be found?	
In what position is Judas?	
What is clutching and why?	
At what point is Jesus' head located? This is a significant position in Renaissance art.	
What symbolic number is evident and why?	

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

General Knowledge Solutions

'Art is never finished, only abandoned' Leonardo da Vinci.
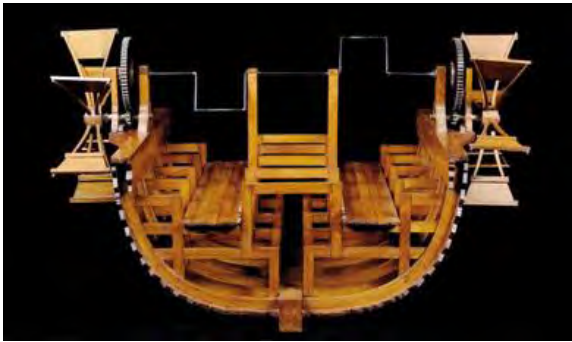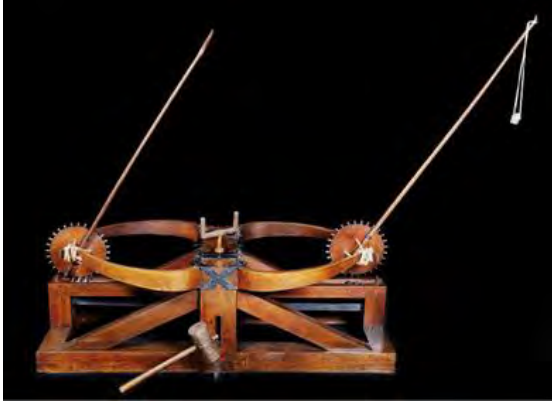
Team Number   _____

1. Renaissance Questions (10 marks)

2. Considered to be the first humanist and Renaissance man	Petrarch
3. Twice written manuscripts were called this	Palimpests
4. Considered the Godfather of the Renaissance, he was born in Florence.	Lorenzo de' Medici
5. This invention spread the humanist ideas wider and improved communication.	Printing press
6. This new aspect to painting rendered art more realistic.	Perspective
7. Said to be one of the greatest Renaissance architects.	Brunelleschi
8. This is the Italian name for rebirth.	Rnascità
9. A famous seer whose prophesies about the world's fate still resonates today.	Nostradamus
10. This man dropped different-sized cannonballs from the top of a building to prove that all objects fell at the same rate of acceleration.	Galileo Galilei
11. The birthplace of the Renaissance.	Florence

2. Leonardo da Vinci's Inventions (10 marks)

What were these inventions to be used for?

	"aerial screw" flying machine
	Paddle propulsion boat

	Mud Dredge designed to clean the beds of lagoon canals and locks.
	This float is used for dropping materials on the bottom of rivers beds in order to raise them and allow the passage of troops.
	Sling shot - double catapult

3. Leonardo's sketches (6 marks)

Find **three** of Leonardo's sketches and explain why they are significant for their time and today in 20 words maximum.
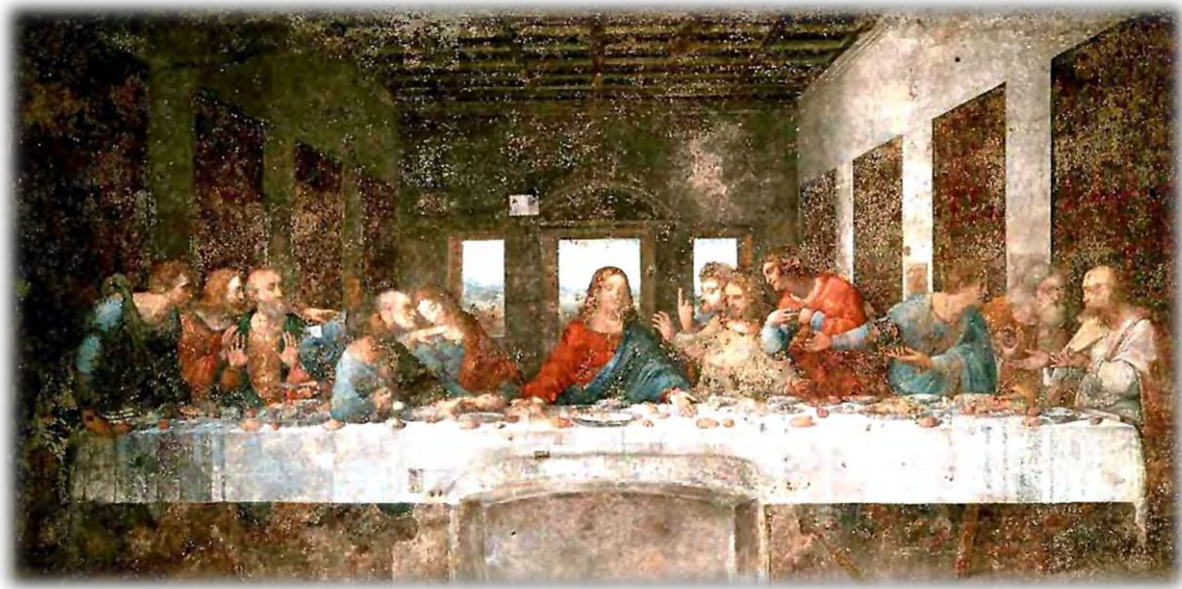
a.

b.

c.

4. Leonardo da Vinci's Horses (10 marks)

Questions	Answers
Leonardo loved to draw horses and he had an ambitious plan to make a sculpture of a horse. Who commissioned this work?	Duke of Milan
What was to be so special about this horse?	It was to be the largest equestrian statue in the world
Who destroyed the clay model built by Leonardo?	The French soldiers who invaded Milan in 1499.
How and why does this sketch reflect the renaissance?	Naturalistic and use of perspective
What was the Italian name for the proposed sculpture?	"Il Cavallo"

5. The Last Supper (10 marks)

Question	Answer
Where is the original painting to be found?	Convent of Santa Maria della Grazie, Milan
In what position is Judas?	Judas is wearing green and blue and is in shadow on the left.
What is clutching and why?	He is clutching a small bag, perhaps signifying the silver given to him as payment to betray Jesus.
At what point is Jesus' head located? This is a significant position in Renaissance art.	His head is located at the vanishing point for all perspective lines.
What symbolic number is evident and why?	The number 3, which represents the Christian belief in the Holy Trinity. The Apostles are seated in groupings of three; there are three windows behind Jesus; and the shape of Jesus' figure resembles a triangle.

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

EXCITE · CHALLENGE · ENRICH

Mathematics Challenge

'No human research can be called true science unless it can be mathematically proved' Leonardo da Vinci.

Team Number _____

Mathematics of Discovery

Calculators are permitted. Time allowed = 50 minutes.
All explanation for working should be given.
Maximum marks = 50.

Question 1. (4 marks)

Evaluate $K = 1 + 2i + 3i^2 + 4i^3 + 5i^4 + 6i^5 + 7i^6 + 8i^7 + \ldots\ldots\ldots + 48i^{47}$ given that $i^2 = -1$.

Note that $i^3 = i \times i^2 = i \times (-1) = -i$ also $i^4 = 1$ and $i^5 = i^4 \times i = i$ and so on.

(Hint: Simplify the series 4 terms at a time.)

Question 2. (4 marks)

The famous English Mathematician G.H. Hardy was visiting a wise Indian Mathematician Srinivasar Ramanujan. Stepping out of a taxi Hardy observed the number on the Taxi to be 1729. Hardy mused that 1729 had no significance. "Not so!" said the wise Indian. He remarked that 1729 is the smallest number that can be written as a sum of two cubes with two different representations.

i.e. $a^3 + b^3 = 1729$ and $c^3 + d^3 = 1729$

Find the unique values of *a,b,c,d* which are all different. These are called **Taxicab numbers**.

Question 3. (4 marks)

Find the smallest integer value of *x* such that $x^x > 500\,000$.

Question 4. (3 marks)

A coin of radius 1 cm is rolled around an equilateral triangle of side 10 cm, always being in contact with the edge of the equilateral triangle. Find the distance travelled by the centre of the coin when the coin has travelled **once** around the equilateral triangle.
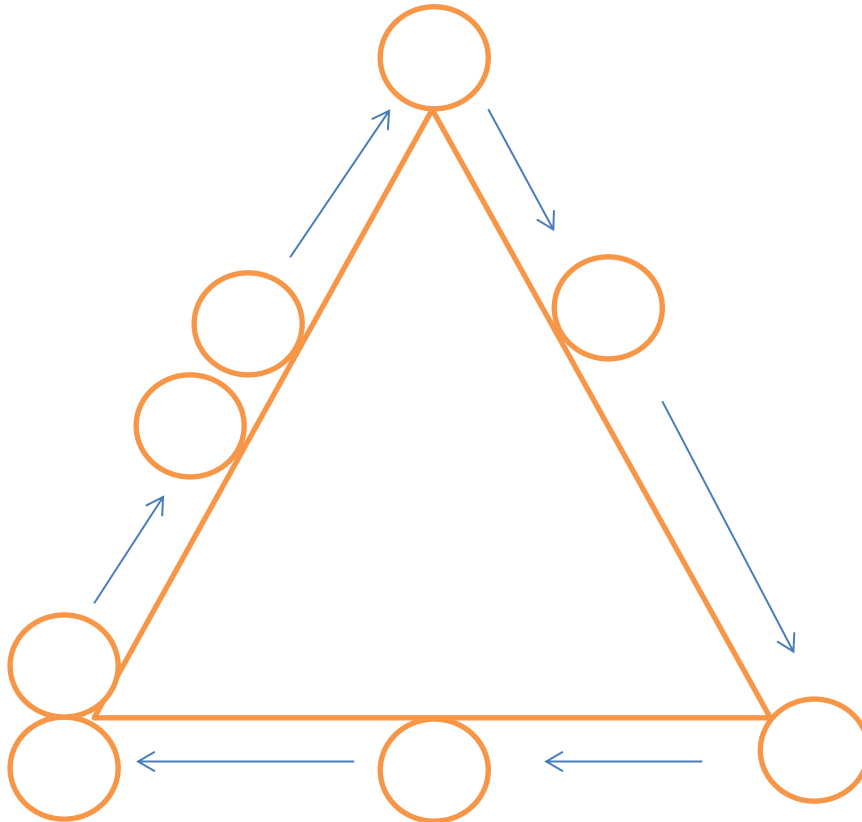
Question 5. (4 marks)

Show that the radius of a quadrant of a circle whose perimeter is numerically equal to its area is given by $r = \dfrac{8+2\pi}{\pi}$. The perimeter of the quadrant includes both radii and the arc.
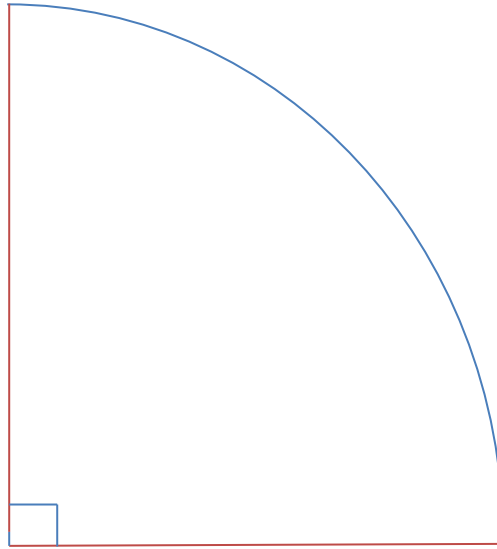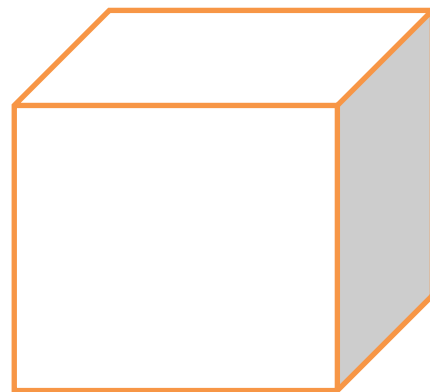
Question 6. (4 marks)

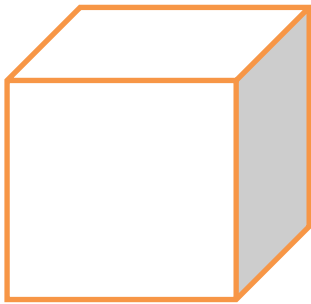Barbara, Maria and Jacqueline invested money in a shop in the ratio 11 : 9 : 4. If the profits are shared in the ratio of 17 : 13 : 6, comment if this is a fair distribution of the profits with respect to the relative investments of each person.

Question 7. (3 marks)

Imagine a cube where each side has its length increased by 10%. What would be the percentage increase in volume of that cube?

Question 8. (4 marks)

The diameter of a wheel on a truck affects the way the speedometer indicates the truck's speed. If the indicated speed of the truck is exactly the same as the **true speed** of the car at 110 km/h for a diameter of 60 cm, what would the **indicated** speed on the speedometer of the truck show if the wheels were replaced with ones of larger diameter of 70 cm. Give your answer to the nearest kilometre per hour.

Assuming the truck continued to travel at a **true speed** of 110 km/h, would the indicated speed be lower or higher with the larger diameter wheels and by how much?

Explain your answer.

Question 9. (4 marks)

Express x in terms of y for this equation, $\dfrac{y}{x-3} = \dfrac{3}{x-y}$.

Question 10. (4 marks)
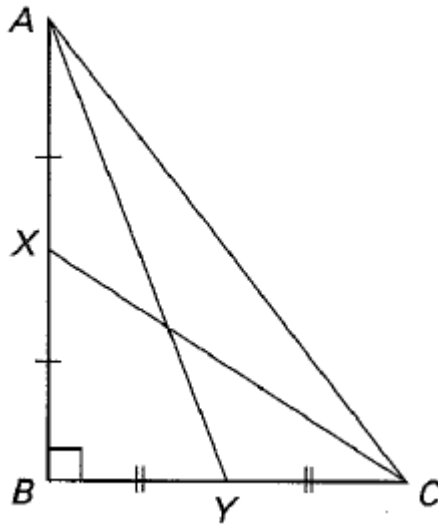
In the right angled triangle *ABC,* medians *CX* and *AY* are drawn. (Medians are lines drawn from the vertex to the midpoint of the opposite side.)

Prove that $4(CX^2 + AY^2) = 5AC^2$.

(Hint: Let *AB* = 2*x,* and *BC* = 2*y*)

Question 11. (4 marks)

If p and q are positive integers $p > q$ and $(p+q)^2 - (p-q)^2 > 29$, find the smallest possible value of p.

Question 12. (4 marks)

If *n* is a positive integer, find the value of the product

$$\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{6}\right)\left(1-\frac{1}{7}\right)\cdots\cdots\left(1-\frac{1}{n}\right).$$

Question 13. (4 marks)

An aeroplane flies at 800 km/h for one third of its total flight time and averages 700 km/hr for the entire trip. What is the average speed, in kilometres per hour over the remaining part of the journey?

Chess Problems

White to play and checkmate in 2 moves

Puzzle 2

White to play and checkmate in 2 moves

Puzzle 3
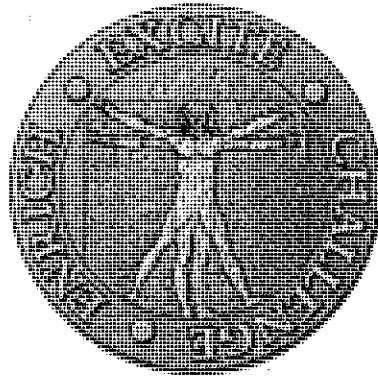
White to play and checkmate in 2 moves

Puzzle 4

White to play and checkmate in 2 moves

International
da Vinci Decathlon

Mathematics Challenge

SOLUTIONS TO CHALLENGE

Mathematics of Discovery

Calculators are permitted. Time allowed = 50 minutes.
All explanation for working should be given.
Maximum marks = 50.

Question 1. (4 marks)

Evaluate $K = 1 + 2i + 3i^2 + 4i^3 + 5i^4 + 6i^5 + 7i^6 + 8i^7 + \ldots\ldots\ldots + 48i^{47}$ given that $i^2 = -1$.

Note that $i^3 = i \times i^2 = i \times (-1) = -i$ also $i^4 = 1$ and $i^5 = i^4 \times i = i$ and so on.

(Hint: Simplify the series 4 terms at a time.)

$$K = \left(1 + 2i - 3 - 4i\right) + \left(5 - 6i - 7 - 8i\right) + \cdots + \left(45i^{44} + 46i^{45} + 47i^{46} + 48i^{47}\right)$$

$$= \left(-2 - 2i\right) + \left(-2 - 2i\right) + \cdots + \left(45 + 46i - 47 - 48i\right) \quad \checkmark\checkmark$$

$$= \left(-2 - 2i\right) + \left(-2 - 2i\right) + \cdots + \left(-2 - 2i\right). \quad \checkmark$$

$$= \left(-2 - 2i\right) \times 12$$

$$= -24 - 24i. \quad \checkmark$$

2

Question 2. (4 marks)

The famous English Mathematician G.H. Hardy was visiting a wise Indian Mathematician Srinivasar Ramanujan. Stepping out of a taxi Hardy observed the number on the Taxi to be 1729. Hardy mused that 1729 had no significance. "Not so!" said the wise Indian. He remarked that 1729 is the smallest number that can be written as a sum of two cubes with two different representations.

i.e. $a^3 + b^3 = 1729$ and $c^3 + d^3 = 1729$

Find the unique values of a,b,c,d which are all different. These are called **Taxicab numbers**.

$12^3 + 1^3 = 1729$ by calculation

$9^3 + 10^3 = 1729$ by calculation.

One mark for each correct value of a, b, c and d.

Question 3. (4 marks)

Find the smallest integer value of x such that $x^x > 500000$.

x	x^x
3	27
4	256
5	3125
6	46656.
7	823543 ✓✓ for table.

Solution is $x \geqslant 7$ ✓✓

3

Question 4. (3 marks)

A coin of radius 1 cm is rolled around an equilateral triangle of side 10 cm, always being in contact with the edge of the equilateral triangle. Find the distance travelled by the centre of the coin when the coin has travelled **once** around the equilateral triangle.
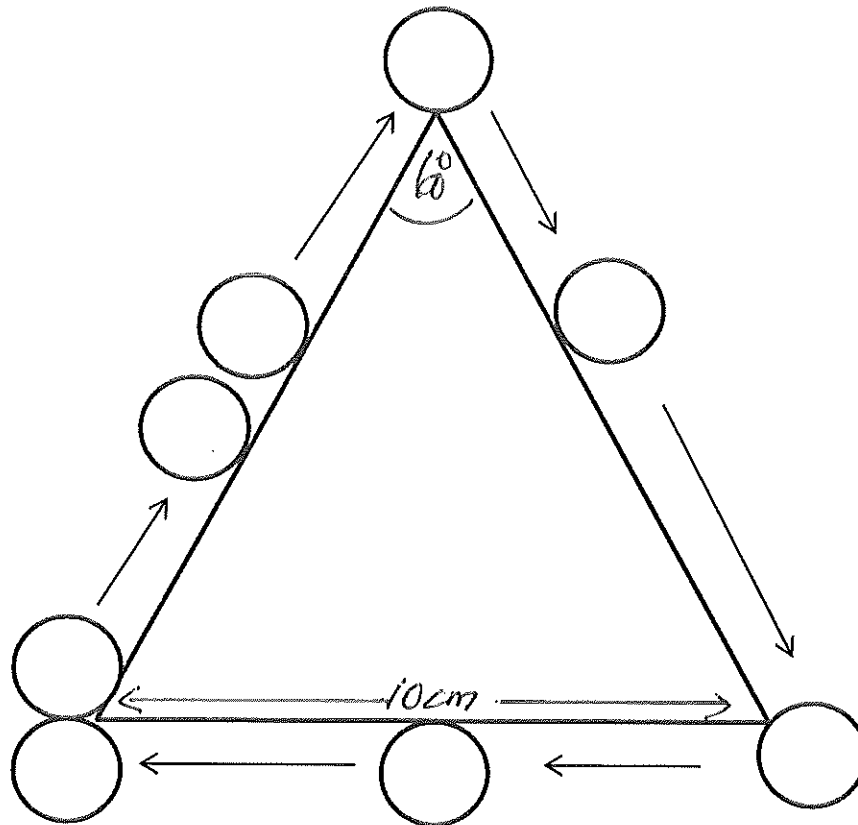
Obtuse $\angle AOB = 360 - (90 + 90 + 60) = 120°$ ✓
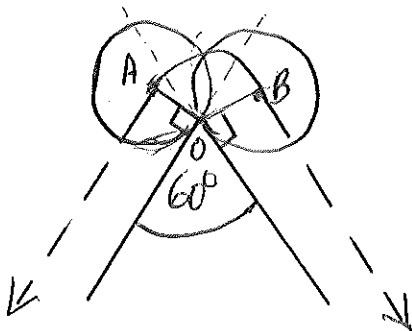
Perimeter $= 10 + 10 + 10 + 3$ arcs of $120°$ ✓

$$= 30 + 3 \times \frac{120}{360} \times 2\pi \times 1$$

$$= 30 + 2\pi \text{ cm}.$$ ✓

4

Question 5. (4 marks)

Show that the radius of a quadrant of a circle whose perimeter is numerically equal to its area is given by $r = \dfrac{8 + 2\pi}{\pi}$. The perimeter of the quadrant includes both radii and the arc.
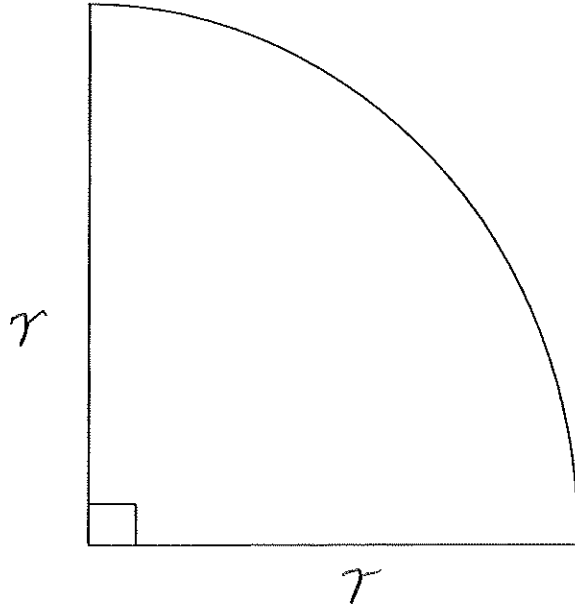
Perimeter of quadrant = Area of quadrant

$$2r + \frac{1}{4} \times 2\pi r = \frac{1}{4} \times \pi \times r^2 \qquad \checkmark$$

$$2r + \frac{\pi r}{2} = \frac{\pi r^2}{4} \qquad \checkmark$$

$$2 + \frac{\pi}{2} = \frac{\pi r}{4} \qquad$$

$$8 + 2\pi = \pi r \qquad \checkmark$$

$$r = \frac{8 + 2\pi}{\pi} \qquad \checkmark$$

$^{\cdot}5$

Question 6. (4 marks)

Barbara, Maria and Jacqueline invested money in a shop in the ratio 11 : 9 : 4. If the profits are shared in the ratio of 17 : 13 : 6, comment if this is a fair distribution of the profits with respect to the relative investments of each person.

	Barbara	Maria	Jacqueline
Investment proportions	$\frac{11}{24}$	$\frac{9}{24} = \frac{3}{8}$	$\frac{4}{24} = \frac{1}{6}$ ✓
Profit proportions.	$\frac{17}{36}$	$\frac{13}{36}$	$\frac{6}{36} = \frac{1}{6}$ ✓
Comments.	$\frac{11}{24} < \frac{17}{36}$ Barbara receives more profit than she should	$\frac{3}{8} > \frac{13}{36}$ Maria gets less than she should	$\frac{1}{6} = \frac{1}{6}$ Jacqueline receives the correct profit. ✓

Question 7. (3 marks)

Imagine a cube where each side has its length increased by 10%. What would be the percentage increase in volume of that cube?
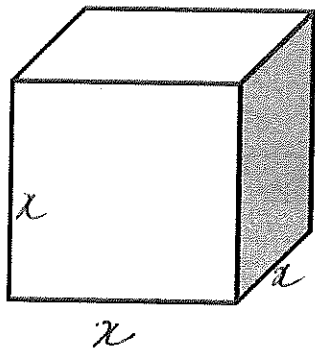
$Volume_1 = x^3$
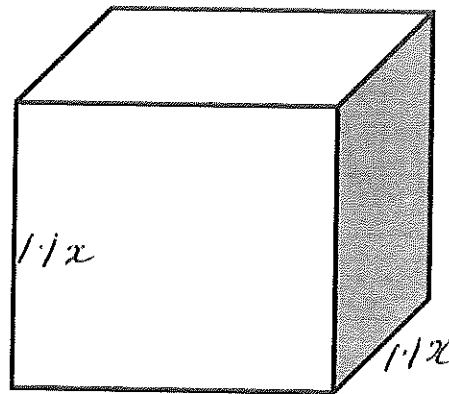
$Volume_2 = 1.1^3 x^3.$

$Volume_2 = 1.331 x^3.$ ✓

Increased volume $= V_2 - V_1 = 1.331 x^3 - x^3$

$= 0.331 x^3.$ ✓

Hence the % increase in volume $= 33.1\%$ ✓

Question 8. (4 marks)

The diameter of a wheel on a truck affects the way the speedometer indicates the truck's speed. If the indicated speed of the truck is exactly the same as the **true speed** of the car at 110 km/h for a diameter of 60 cm, what would the **indicated** speed on the speedometer of the truck show if the wheels were replaced with ones of larger diameter of 70 cm. Give your answer to the nearest kilometre per hour.

Assuming the truck continued to travel at a **true speed** of 110 km/h, would the indicated speed be lower or higher with the larger diameter wheels and by how much?

Explain your answer.

The larger the diameter of the wheel the lower the speed read by the car (truck) given that the vehicle is travelling with constant speed. ✓

$$\text{Diameter} = \frac{k}{\text{Speed}}. \qquad 60cm = \frac{k}{110\,KpL} \qquad \text{hence } k = 6600 ✓$$

When the wheel has diameter 70cm.

$$70 = \frac{6600}{\text{Speed}} \qquad \text{Speed} = \frac{6600}{70} = 94.28\,km/hr ✓$$
$$= 94\,km/hr \text{ (nearest } km/hr)$$

Hence speed reading is 16 km/hr slower than it should be. ✓

Question 9. (4 marks)
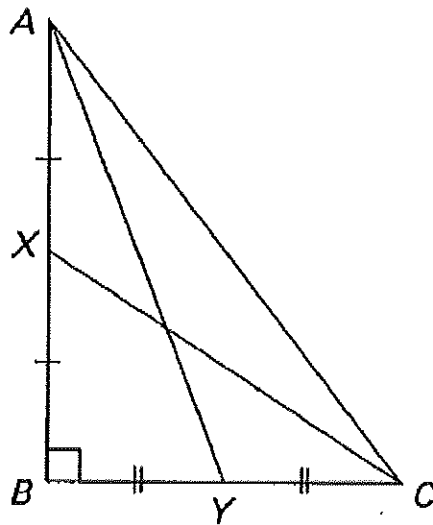
Express x in terms of y for this equation, $\dfrac{y}{x-3} = \dfrac{3}{x-y}$.

✓ $\quad y(x-y) = 3x - 9$

$\quad xy - y^2 = 3x - 9$

✓ $\quad xy - 3x = y^2 - 9$

✓ $\quad x(y-3) = (y-3)(y+3)$

✓ $\quad x = y+3 \qquad\qquad y \neq 3.$

7

Question 10. (4 marks)

In the right angled triangle *ABC*, medians *CX* and *AY* are drawn. (Medians are lines drawn from the vertex to the midpoint of the opposite side.)

Prove that $4(CX^2 + AY^2) = 5AC^2$.

(Hint: Let *AB* = 2*x*, and *BC* = 2*y*)

$$CX^2 = x^2 + (2y)^2 = x^2 + 4y^2 \qquad \checkmark$$

$$AY^2 = (2x)^2 + y^2 = 4x^2 + y^2 \qquad \checkmark$$

$$LHS = 4(CX^2 + AY^2) = 4(x^2 + 4y^2 + 4x^2 + y^2)$$

$$= 20(x^2 + y^2). \qquad \checkmark$$

$$RHS = 5AC^2 = 5(4x^2 + 4y^2) = 4(CX^2 + AY^2) \qquad \checkmark$$

$$= LHS.$$

$$\checkmark \text{Hence } 4(CX^2 + AY^2) = 5AC^2$$

Question 11. (4 marks)

If p and q are positive integers $p > q$ and $(p+q)^2 - (p-q)^2 > 29$, find the smallest possible value of p.

$$(p+q)^2 - (p-q)^2 > 29$$

$$p^2 + 2pq + q^2 - (p^2 - 2pq + q^2) > 29$$

$$4pq > 29$$

$$pq > 7\frac{1}{4} \qquad \checkmark\checkmark$$

As p & q are positive integers with $p > q$.

p	largest value of product pq
1	
2	$2 \times 1 = 2$
3	$3 \times 2 = 6$
4	$4 \times 3 = 12$ $\checkmark$

Hence 4 is the smallest possible value of p. $\checkmark$

9

Question 12. (4 marks)

If n is a positive integer, find the value of the product

$$\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{6}\right)\left(1-\frac{1}{7}\right)........\left(1-\frac{1}{n}\right).$$

$$= \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \cdots \left(\frac{n-2}{n-1}\right)\left(\frac{n-1}{n}\right)$$ ✓✓

$$= \text{Cancelling we have the series collapsing}$$
$$\text{yielding } \frac{1}{n} \text{ as the final value .}$$ ✓✓

Question 13. (4 marks)

An aeroplane flies at 800 km/h for one third of its total flight time and averages 700 km/hr for the entire trip. What is the average speed, in kilometres per hour over the remaining part of the journey?

Suppose the first part of the journey takes "t" hours and the second part takes $2t$ hours. ✓

The distance travelled in the first part is $800t$ km and for the whole trip is $700 \times 3t = 2100$ km . ✓

Distance travelled in the second part
$$= 2100t - 800t = 1300t \text{ km .}$$ ✓

Hence average speed in the second half
$$= \frac{1300t}{2t} = 650 \text{ km/hr.}$$ ✓

End of Challenge

10

VIRILE AGITUR

International da Vinci Decathlon

Celebrating the Academic Gifts of International Youth

Philosophy

'All our knowledge has its origins in our perceptions' Leonardo da Vinci.

Team Number _____

Section 1: Fields of Philosophy

In 15 words or less, define each of the following branches of Philosophy:

1. Epistemology

_____

_____

_____

2. Aesthetics

_____

_____

_____

3. Metaphysics

_____

_____

_____

/15
(5 each)

Section 2: The Philosophers

Imagine in the 'after-life', philosophers from history have the opportunity to meet and discuss their perspectives on Philosophy.

Select at least two philosophers and write a transcript of the discussion they would be likely to have. In your transcript, you should include references to their key beliefs about Philosophy. Choose from: Plato, Socrates, Aristotle, Locke, Rousseau, Marx, and/or Kant. Length: 200-300 words

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

/15

Section 3: Arguments and Fallacies

Instructions:
Read each of the following scenarios. For each scenario, prepare an argument based on the scenario and your role. In your argument, use a range of logical fallacies to apply your knowledge and understanding of logic. For each fallacy you employ, label it in the column and briefly explain how it has been used. Length: 300-400 words

Scenario 1
An International Cancer Society concludes after a long study of the impact of mobile phones that there could be a significant risk of developing cancer for those who regularly use such phones, though they also conclude that the existing evidence is not strong enough for them to say categorically that regular phone use causes cancer. They say that more research needs to be done. They do argue that regular exposure to radio frequency fields may pose a significant risk, especially to children.

As the principal of a school you are to write a media release that makes recommendations to school students under your care.

Scenario 2
You join a very successful, dynamic business organisation dealing in fashion clothing. This organisation has recorded considerable profits over the last 3 years. It has been a very strong performer on the stockmarket.

One night while working late you see a file sitting on the photocopier. Some pages have fallen out and as you place them back into the folder you notice an 'Urgent Memo' on one page that explains the close connection between the organisation, the products it sells and fashion garment production factories in a country in south Asia.

On doing some research, you also learn that such a factory recently collapsed and killed over 1000 local workers. An official investigation is taking place there over the question of inadequate working conditions, labour conditions and safety standards. On further investigation, you learn that 60% of the products that your organisation sells are made in such factories.

As the union representative at the organisation, your colleagues have asked you to speak to management about these concerns. Prepare the argument you would to present to management.

	Name of fallacy and explanation

/15

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

EXCITE · CHALLENGE · ENRICH

Philosophy

All our knowledge has its origins in our perceptions' Leonardo da Vinci.

Team Number _____

Section 1: Fields of Philosophy

In 15 words or less, define each of the following branches of Philosophy

1. Epistemology

Answer could include references such as (but not limited to): Knowledge, 'justified belief', limitations, justification, truth, rationality /5

2. Aesthetics

Answer could include references such as (but not limited to): attitude, beauty, value, experience, pleasant, perception, as opposed to practical, imagination, sublime /5

3. Metaphysics

Answer could include references such as (but not limited to): the study of being or what really exists, theology, nature of the natural world, Aristotle, wisdom, 'after the physical ones' /5

/15
(5 each)

Section 2: The Philosophers

Imagine in the 'after-life', philosophers from history have the opportunity to meet and discuss their perspectives on Philosophy.

Select at least two philosophers and write a transcript of the discussion they would be likely to have. In your transcript, you should include references to their key beliefs about Philosophy. Choose from: Plato, Socrates, Aristotle, Locke, Rousseau, Marx, and/or Kant. Length: 200-300 words

Marking Criteria	Marks
• Composes an engaging and astute imaginative discussion that integrates philosophical perspectives accurately, skilfully and seamlessly. • Perceptively explores the perspectives of at least two philosophers. • Demonstrates skilful control of language and structure appropriate to audience, purpose, context and form.	13 - 15
• Composes an engaging and thoughtful imaginative discussion that integrates philosophical perspectives accurately, effectively and in a well-integrated manner. • Thoughtfully explores the perspectives of at least two philosophers. • Demonstrates effective control of language and structure appropriate to audience, purpose, context and form.	10 - 12
• Composes a competent imaginative discussion that integrates some philosophical perspectives in a mostly accurate manner. • Explores the perspectives of at least two philosophers. • Demonstrates competent control of language and structure appropriate to audience, purpose, context and form.	7 - 9
• Attempts to compose imaginative discussion that integrates aspects of philosophical perspectives but has inconsistencies or inaccuracies. • Attempts to explore the perspectives of at least one philosopher. • Demonstrates variable control of language and structure with limited appropriateness for audience, purpose, context and/or form.	4 - 6
• Attempts to compose an imaginative discussion. • Elementary exploration of at least one philosopher. • Demonstrates limited control of language and form.	1 - 3

Individual perspectives could include (but not limited to) references to the following:

Plato (b. 428 B.C.)
1. Society functions best if each person understands his/her strengths and weaknesses and performs his/her proper role. Talent, not wealth, determines a citizen's proper role, i.e., strong and courageous men become soldiers, those skilled with their hands become laborers, etc.
2. Education essential for good government—teach people to be good citizens.
3. Democracy is "mob rule," yet also said power should not be located in a power autocrat. Believed in philosopher-kings—the smartest lovers of knowledge should rule.
4. Children property of government and loyal to government so that power would never be hereditary—each person educated and role determined by skills and merits.
5. Live communally—no pay and no property. Three classes: 1) Philosopher Kings,
2) Guardians to defend society, 3) Ordinary citizens whose duty was obedience.

Socrates was a classical Greek Athenian philosopher. Credited as one of the founders of Western philosophy, he is an enigmatic figure known chiefly through the accounts of later classical writers, especially the writings of his students Plato and Xenophon, and the plays of his contemporary Aristophanes. Many would claim that Plato's dialogues are the most comprehensive accounts of Socrates to survive from antiquity.

Through his portrayal in Plato's dialogues, Socrates has become renowned for his contribution to the field of ethics, and it is this Platonic Socrates who also lends his name to the concepts of Socratic irony and the Socratic method, or elenchus. The latter remains a commonly used tool in a wide range of discussions, and is a type of pedagogy in which a series of questions are asked not only to draw individual answers, but also to encourage fundamental insight into the issue at hand. It is Plato's Socrates that also made important and lasting contributions to the fields of epistemology and logic, and the influence of his ideas and approach remains strong in providing a foundation for much western philosophy that followed.

Aristotle (b. 384 B.C.)
1. Humans are not born good, but learn to be virtuous.
2. Best government provides for a properly educated middle class – they are free of excesses found in upper and middle class.
3. Democracy is the least dangerous form of government, but can lead people to believe they are equal in every way—which they are not!
4. Majority is supreme and whatever they approve must be just.
5. Monarchy and aristocracy are acceptable so long as ruler is virtuous and takes advice from philosophers.

John Locke (b. 1632)
1. Believed that men were born free with certain natural rights—life, liberty, and property. Thought people had the gift or reason (ability to think), which ensured that in a state of nature they would look after the well being of society and treat all people equally.
2. People form gov't to protect themselves from others who would deprive them of their natural rights. They enter into a contract with government to protect natural rights. If gov't does not hold up its end of the bargain, people have the right to change governments.
3. Strived for limitation on powers of monarchy—rejected theory of divine rights.
4. Believed women had ability to reason, thus deserve equality.

Jean-Jacques Rousseau (b. 1712)
1. Believed people are born free, independent, and compassionate. People would live happily and peacefully in a state of nature. Corruption of modern countries harms the individual by giving too few people too much power over many others. Society's institutions corrupt naturally good individuals.
2. Believed in a direct democracy—any law where the people have not ratified in person is void (against representative democracy).
3. People can be both ruled and free if they rule themselves. They can establish a social contract where they have direct say in the way their society is governed.
4. When men join together in a community, individual rights are transferred to group. In a monarchy, men retain certain natural rights that king or sovereign must respect, but king can impose the "general will" on individuals.
5. Each person places his person and authority under the supreme direction of the general will; and the group receives each individual as an indivisible part of the whole.
6. Everyone must obey the general will—if not, must be forced to do so—"it may be necessary to force a man to be free, freedom in this case being obedience to the will of all."
7. Rule belonged to the people and they could rise up against their government if it is not representing the people. (French Revolution used his beliefs.)
Karl Marx (b. 1818)
1. According to Marx, the history of the world was the history of class conflict (the 'haves' verses the 'have nots').
2. Developed a philosophy of economics called communism that had profound political implications.
3. Communism was a reaction against the industrial revolution deprivation of the rights and dignities of the working class.
4. Believed industrialism forced people into two rival categories: the middle class and the working class. These classes would always fight for political power, but the middle class would always rule because it owned the factories, property, and money and needed to oppress the workers to stay in power.
5. He advised workers to form unions that would overthrow the middle class.
6. He believed there were four steps to achieving communism: feudalism (serfs serving lords, working the land for nothing), capitalism (money exchanged for goods and services), socialism (in which everything is owned by

4

the government, which oversees a classless society), and finally communism (a utopian worker's society with no government or classes).
7. Thus, the ideal society was one devoid of a structured government (though this is not to be confused with anarchy). Marx's society would be a peaceful utopia.

Kant
***Big ideas:** Absolute spirit; Zeitgeist; Hegelian dialectic.*

The universe is a giant network connecting everything. Therefore, every person, object, or idea that has ever existed is part of a greater whole, known as the Absolute spirit.
People's thoughts are guided by the political and cultural atmosphere of a particular moment in history, or what Hegel called the Zeitgeist (which translates from German as time-spirit).

Great strides have been made politically and socially through Hegel's interpretation of the dialectic—a method of argument, first used by the Greek philosophers, based on the theory that a consensus can be reached through the discussion of two dissenting opinions. In Hegel's view, a thesis is proposed; it is countered by an anti-thesis. Then the two ideas meet in a violent clash and are eventually resolved in a synthesis. This synthesis becomes the new thesis, and the process continues until truth is reached. Revolutionary figures of the 19th and 20th centuries, such as Karl Marx, used Hegel's formula to influence their arguments.

Section 3: Arguments and Fallacies

Instructions

Read each of the following scenarios. For each scenario, prepare an argument based on the scenario and your role. In your argument, use a range of logical fallacies to apply your knowledge and understanding of logic. For each fallacy you employ, label it in the column and briefly explain how it has been used. Length: 300-400 words

Scenario 1
The Australian Cancer Society concludes after a long study of the impact of mobile phones that there could be a significant risk of developing cancer for those who regularly use such phones, though they also conclude that the existing evidence is not strong enough for them to say categorically that regular phone use causes cancer. They say that more research needs to be done. They do argue that regular exposure to radio frequency fields may pose a significant risk, especially to children.

As the Principal you are to write a media release that makes recommendations to school students under your care.

Scenario 2
You join a very successful, dynamic business organisation dealing in fashion clothing. This organisation has recorded considerable profits over the last 3 years. It has been a very strong performer on the stockmarket.

One night while working late you see a file sitting on the photocopier. Some pages have fallen out and as you place them back into the folder you notice an 'Urgent Memo' on one page that explains the close connection between the organisation, the products it sells and fashion garment production factories in a country in south Asia.

On doing some research, you also learn that such a factory recently collapsed and killed over 1000 local workers. An official investigation is taking place there over the question of inadequate working conditions, labour conditions and safety standards. On further investigation, you learn that 60% of the products that your organisation sells are made in such factories.

As the union representative at the organisation, your colleagues have asked you to speak to management about these concerns. Prepare the argument you would to present to management.

Marking Criteria	Marks
• Composes a skilful response that explores the scenario in an insightful manner. • Perceptively, judiciously and seamlessly integrates logical fallacies. • Demonstrates skilful control of language and structure appropriate to audience, purpose, context and form.	**13 - 15**
• Composes an effective response that explores the scenario in a thoughtful manner. • Effectively seamlessly integrates logical fallacies in a discerning manner. • Demonstrates effective control of language and structure appropriate to audience, purpose, context and form.	**10 - 12**
• Composes a sound response that explores the scenario in a competent manner. • Integrates logical fallacies in a competent manner. • Demonstrates competent control of language and structure appropriate to audience, purpose, context and form.	**7 - 9**
• Attempts to compose a response that explores the scenario in a competent manner. • Attempts to integrate logical fallacies in a limited manner. • Demonstrates variable control of language and structure with limited appropriateness for audience, purpose, context and/or form.	**4 - 6**
• Attempts to compose a response. • Elementary exploration of logical fallacies. • Demonstrates limited control of language and form.	**1 - 3**

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

Science

'The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them' William Lawrence Bragg (Nobel Laureate).

Team Number _____

On the Discovery Trail with Epidemiologists
Past and Present

Epidemiology: The *field of medicine concerned with the study of epidemics. Epidemiologists investigate the cause of a disease, its distribution, method of spread, and measures for control and prevention.*

John Snow and the Cholera Outbreak of the 1840s

A disease known as cholera was sweeping through parts of London in 1848. Thousands of people were developing severe diarrhoea and vomiting, many becoming so dehydrated they did not survive. It is estimated that over 53,000 died in London during this outbreak.

The cause of the disease was not understood at this time. Most scientists believed that cholera was spread by bad air which they referred to as miasma. Dr John Snow, after recognising that the symptoms were intestinal, had another idea: cholera was carried in the water.

At this time most households collected their water from communal pumps which in turn drew their water from the Thames River. In attempting to understand the disease, John Snow obtained information on the number of deaths in the affected area and marked them on a map(figure 1).

Figure 1: Dr John Snow and his original map of the ourbreak area in London
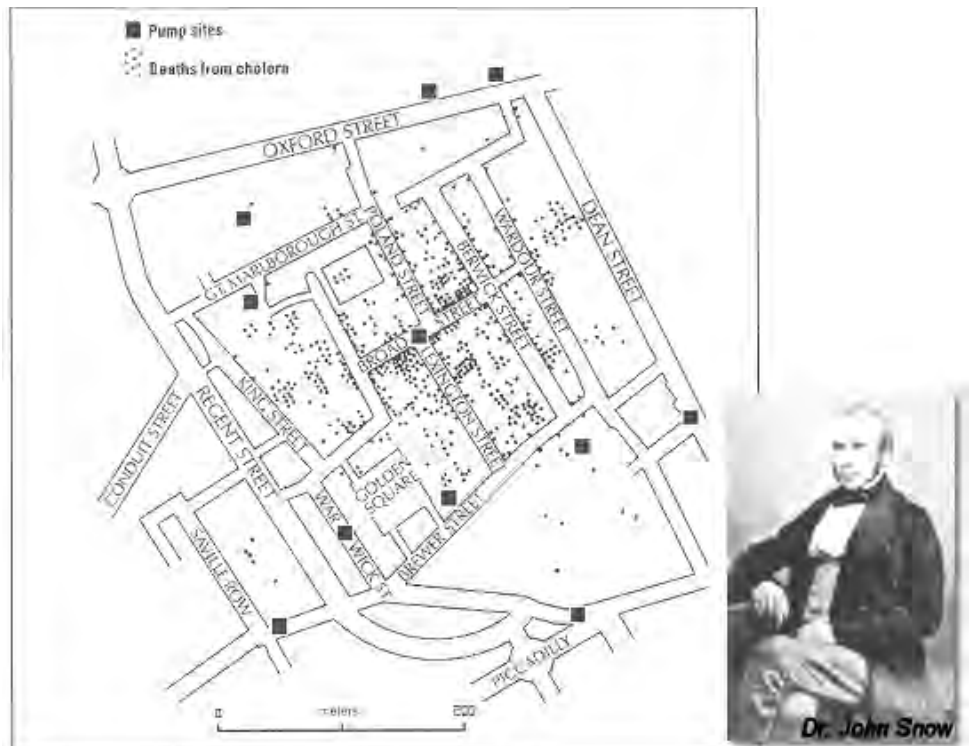
(source:http://healthcybermap.org/HGeo/pg1_1.htm)

1. State Dr Snow's hypothesis. *(1 mark)*

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

2. *What was the advantage of mapping the casualties and water pumps?* *(2 marks)*

………

………

………

………

………

………

3. *Snow determined that one particular pump was the source of the cholera. Which pump is the most likely source? Give reasons for your choice.* *(3 marks)*

………

………

………

………

………

………

………

………

4. *How could Snow have further tested his hypothesis? Remember that at this time there was no knowledge of microbiology.* *(4 marks)*

………

………

………

………

………

………

………

………

………

5. *Would these techniques have been conclusive proof of his hypothesis? Explain.*

(3 marks)

……

……

……

……

……

……

……

……

……

……

Dr Snow convinced the local authorities to remove the handle of the suspect pump and the outbreak ended. However, his hypothesis that cholera was caused by a water-borne contaminant was not accepted for many decades. Polluted water continued to be drawn from the Thames. Many thousands more died before the germ theory of disease was commonly accepted in the late 1800s.

6. *What is the 'germ theory of disease'?* (2 marks)

……

……

……

……

……

7. *We now know that cholera is caused by a bacterium called Vibrio cholera which enters water sources in the faeces of infected individuals. How could modern epidemiologists test Snow's theory using current methodologies?* (4 marks)

……

……

……

……

……

……

……

……

....

....

     8. *Propose a reason why only one pump appears to have been the source of the London cholera outbreak.*   *(3 mark)*

....

....

....

....

....

....

....

....

....

....

The Cholera Outbreak in Haiti, 2010

On January 12, 2010 a 7.0 magnitude earthquake struck near the capital of the Caribbean nation of Haiti. It was estimated that more than 150,000 people died and over a million were forced to abandon their homes. The world responded with an abundance of aid including personnel, supplies and funds.

A cholera outbreak was first reported in Haiti in October 2010. It is still ongoing, with over 8,000 deaths and 360,000 hospitalisations, as of July, 2013.
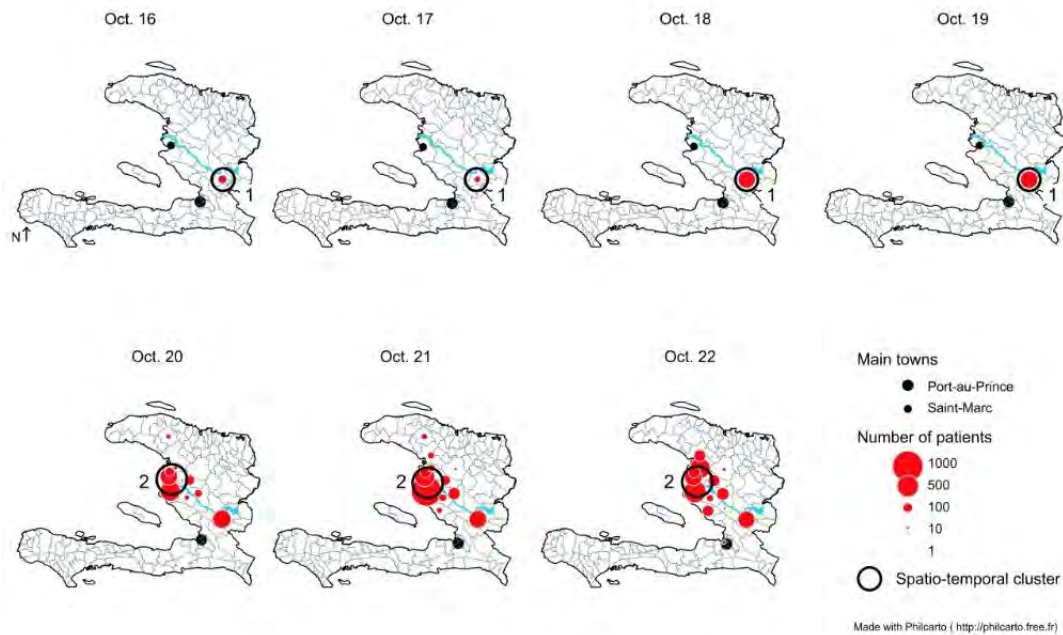
Figure 2: Evolution of cholera cases during the first week of the outbreak
(source: http://www.sph.unc.edu/courses/john_snow/epilogue.htm)

Scientists proposed two hypotheses for the origin of the Haiti cholera outbreak:

- The Vibrio cholera bacteria were already dormant in the warm coastal waters surrounding Haiti. The earthquake disrupted the local environment, leading to the bacteria being disturbed and the outbreak's inception.
- The bacteria were brought to Haiti by infected aid workers who had arrived from overseas to assist in the rebuilding of the nation after the disaster.

The UN sent a team of epidemiologists to determine the source of the outbreak and the best method of controlling the spread of the disease.

You are that team.

9. *State your hypothesis of the cause of the cholera outbreak.* *(2 marks)*

……
……
……
……
……

10. *Outline an investigation to prove your hypothesis.* *(10 marks)*

……
……
……

....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....

11. Propose steps to control the outbreak.   *(6 marks)*

....
....
....
....
....
....
....
....
....
....

END OF TASK

VIRILE AGITUR

International da Vinci Decathlon

*Celebrating the Academic Gifts
of International Youth*

Science Solutions

'The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them' William Lawrence Bragg (Nobel Laureate).

Team Number   _____

On the Discovery Trail with Epidemiologists Past and Present

John Snow and the Cholera Outbreaks of the 1840s

1. State Dr Snow's hypothesis. *(1 mark)*

Cholera is caused by the consumption of contaminated water.

2. What was the advantage of mapping the casualties and water pumps? *(2 marks)*

Mapping both casualties and water pumps gives a <u>visual representation</u> of the geographic <u>relationship between the two</u> which is not obvious from lists of written data.

3. Snow determined that one particular pump was the source of the cholera. Which pump is the most likely candidate? Give reasons for your choice. *(2 marks)*

The central pump at the intersection of Broad Street and Lexington Street appears to be the source of the cholera. (1)
This pump is in the centre of the location of the majority of the cases. (1)

4. How could Snow have further tested his hypothesis? Remember that at this time there was no knowledge of microbiology. *(4 marks)*

4 marks	*Logical investigation outlined in detail which accounts for victims near the pump, victims at a distance from pump, healthy individuals near pump* *OR* *Sealing off pump and mapping future cases over time*
3 marks	*One element missing*
2 marks	*Two elements missing*
1 mark	*Three elements missing*

Sample answer: Snow could have interviewed casualties or family members to see if they had drunk water from the pump. He would expect those who became ill all drank the water, even those who lived at a distance. People who lived nearby but did not develop cholera would not have drunk the well water.

5. Would these techniques have been conclusive proof of his hypothesis? Explain.

(3 marks)

3 marks	*No.* *Evidence would support but not conclusively prove* *Modern techniques to test for bacterial presence would be required (1 mark per point)*
2 marks	*One point missing*
1 mark	*Two points missing*

6. What is the 'germ theory of disease'? *(2 marks)*

Micro-organisms (germs) infect other organisms causing an adverse reaction (disease)

7. We now know that cholera is caused by a bacterium called *Vibrio cholera* which enters water sources with the faeces of infected individuals. How could modern epidemiologists test Snow's theory using current methodologies?   *(4 marks)*

4 marks	Collect samples of suspect water and from patients (stool samples) Place samples on/in culture material Leave for several days to allow culture to grow Examine for presence of cholera bacteria
3 marks	One element missing
2 marks	Two elements missing
1 mark	Three elements missing

8. Propose a reason why only one pump appears to have been the source of the London cholera outbreak. *(3 mark)*

Pumps obtained their water from <u>different parts of the Thames</u>. The contaminated pump must have taken water from a <u>part of the river which contained the cholera bacteria</u>, probably <u>due to sewerage being dumped into this portion</u> of the river.

The Cholera Outbreak in Haiti, 2010

9. State your hypothesis of the cause of the cholera outbreak.   *(2 mark)*

A <u>testable</u> hypothesis which restates one of the hypotheses above

10. Outline an investigation to prove your hypothesis.   *(10 marks)*

7-10 marks	Clear, logical and thorough plan which tests the hypothesis fully, including geographic source identification and progress; testing samples for cholera bacteria; search for links to equivalent ecosystems OR outbreaks in other parts of globe.
3-6 marks	Clear plan which lacks sufficient detail to fully test the stated hypothesis
1-3 marks	Brief plan which may not test the stated hypothesis

Sample answers:

- **Coastal water hypothesis:** *Local waters should be tested. If possible pre-outbreak waters should be tested (sourced from isolated tanks or other sources). Water in similar nearby ecosystems should be tested. All testing done according to method laid out in question 7. Look at the pattern of the outbreak to try to identify location of the source. Examine historical records to determine if there have been cholera outbreaks in Haiti in the past. Attempt to determine what happened in October to trigger the outbreak.*

OR

- **Aid worker hypothesis:** *Map movements of aid workers and concurrent international cholera outbreaks. Test aid workers (using method from question 7). Test cholera to*

see if it is the same strain as another international outbreak. Determine location of the first outbreaks in Haiti and relate this to arrival of aid workers.

11. Propose steps to control the outbreak. *(6 marks)*

One mark for each of the following:
- *Prevent all human use of contaminated water*
- *Ensure no sewerage is discharged into water sources*
- *Purify all water used in the area*
- *Educate the population about the spread of cholera and prevention measures*
- *Vaccinate the local population*
- *Monitor the progress of the outbreak and modify these measures as necessary*

In case you are interested: The team of UN epidemiologists conclusively showed that the bacteria was brought by a group of Nepalese aid workers by using DNA fingerprinting technology to compare bacteria from the Haiti earthquake to a simultaneous Nepalese outbreak.