

# Digital Technologies - Below satisfactory - Years 5 and 6

## Portfolio summary

This portfolio of student work shows that the student can explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks (WS3). The student can explain how digital systems use whole numbers as a basis for representing a variety of data types (WS4).

The student can define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems (WS1, WS2). The student can incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions (WS1, WS2), including a visual program (WS2). They explain how information systems and their solutions meet needs and consider sustainability (WS1). Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols (WS1, WS2).

## Digital project: Learning tool

### Sample summary

Students collaboratively designed a learning tool featuring branching and repetition. The learning tool aimed to provide opportunities for players (Year 3 and 4 students) to explore, practise and apply mathematical concepts and skills (multiplication and division). The learning tool provided opportunities for the player to work through levels. Students also collected and validated data about what the students already knew about multiplication using three simple tests before and after using the learning tool. They collated the data from six students, represented it in a graph and commented on their findings. Students evaluated the solution.

## Achievement standard

### Subject

### Learning Area

By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. They explain how digital systems use whole numbers as a basis for representing a variety of data types.


Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. They explain how information systems and their solutions meet needs and consider sustainability. Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols.

Learning tool

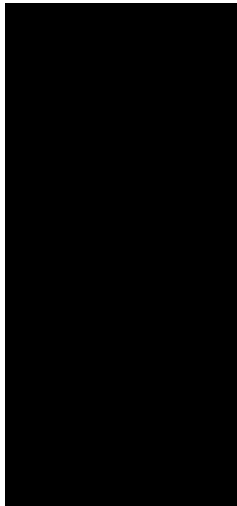
Digital 56 WS1 B

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➦ Share

## Nice man



Data collection



Pre-test: Multiplication  
Pre-test 1 recording sheet

Instructions: Read these questions to the Year 4 student who is taking the test:  
I am going to ask you ten questions about times tables. You have to work them out without a calculator or a pencil and paper. I will check your answer and at the end I will tell you your score out of ten.

Are you ready? Let's go. ✖

Question	Answer	A	B	C	D	E	F
1. $2 \times 9$	18	✓	✓	✓	✗		
2. $5 \times 6$	30	✓	✓	✓	✓		
3. $10 \times 0$	0	✓	✓	✓	✓		
4. $5 \div 5$	5	✗	✓	✓	✓		
5. $3 \times 7$	21	✓	✓	✓	✓		
6. $3 \times 12$	36	✓	✓	✓	✓		
7. $7 \times 2$	14	✓	✓	✓	✓		
8. $4 \times 3$	12	✓	✓	✓	✓		
9. $6 \times 5$	30	✓	✓	✓	✓		
10. $4 \times 10$	40	✓	✓	✓	✓		
		7 / 10	7 / 10	7 / 10	7 / 10	7 / 10	7 / 10



Annotations

- 1 **Annotation 1**  
Collects data from some students using pre-tests and post-tests

Pre-test 2 recording sheet

Use your calculator to solve these ten questions.



You will have 1 minute.

1.  $4 \times 2 =$     2.  $2 \times 9 =$     3.  $5 \times 5 =$     4.  $10 \times 5 =$     5.  $1 \times 7 =$   
 6.  $3 \times 4 =$     7.  $7 \times 5 =$     8.  $6 \times 2 =$     9.  $10 \times 9 =$     10.  $5 \times 0 =$

Question	Answer	A	B	C	D	E	F
1	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	18	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	25	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	35	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	90	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		10	10	10	10	10	10

Pre-test 3 recording sheet

How good are you at multiplication?

For each question shade in the box which has the right answer. Here is an example:

Example:  $3 \times 5 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	20	15	30

1.  $2 \times 8 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	26	14	10

2.  $3 \times 3 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	13	6	9

3.  $5 \times 10 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50	55	15	45

4.  $3 \times 6 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	36	9	24

5.  $6 \times 7 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42	47	34	48

6.  $8 \times 10 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50	40	40	41

7.  $5 \times 9 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50	14	41	45

8.  $2 \times 0 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	20	0	11

9.  $10 \times 4 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44	14	24	40

10.  $3 \times 11 =$

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33	33	31	34

Answer	A	B	C	D	E	F
1	25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	50	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	42	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	60	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	45	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	40	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	33	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		10	10	10	10	10

Post-test: Multiplication

Post-test 2 recording sheet

Instructions: Read these to your friend who is taking the test. I am going to ask you ten questions about times tables. You have to work them out without a calculator or a pencil and paper. I will check your answer and at the end I will tell you how well you did. I am going to compare your score to the score you got before you played my game.

Question	Answer	A	B	C	D	E	F
1	18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	36	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	45	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	80	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		10	10	10	10	10	10

**Post-test 2 recording sheet**  
 Use your calculator to solve these ten questions.  
 You will have 1 minute.

1.  $3 \times 4 =$     2.  $9 \times 2 =$     3.  $5 \times 5 =$     4.  $8 \times 10 =$     5.  $7 \times 1 =$   
 6.  $4 \times 4 =$     7.  $11 \times 1 =$     8.  $2 \times 6 =$     9.  $9 \times 10 =$     10.  $7 \times 0 =$

Question	Answer	A	B	C	D	E	F
1	4						
2	18						
3	25						
4	80						
5	7						
6	16						
7	11						
8	12						
9	90						
10	0						
		10	10	10	10	10	10

**Post-test 3 recording sheet**  
 Which is correct? In these questions some are right and some are wrong. Tick or cross them.

1.  $5 \times 3 = 15$     2.  $10 \times 9 = 99$     3.  $3 \times 2 = 3$     4.  $6 \times 3 = 23$     5.  $6 \times 7 = 76$   
 6.  $10 \times 0 = 100$     7.  $9 \times 1 = 9$     8.  $4 \times 4 = 16$     9.  $11 \times 2 = 22$     10.  $0 \times 8 = 80$

Answer	A	B	C	D	E	F
1	Y					
2	N					
3	Y					
4	N					
5	N					
6	N					
7	Y					
8	Y					
9	Y					
10	N					
	10	10	10	10	10	10

**Multiplication pre and post-test results**

**Collecting data**  
 Collate the data from the pre-test and post-tests in an Excel spreadsheet and paste below.

Student	A	B	C	D	E	F
Pre-1	7	8	7	5		
Post-1	7	9	8			
Pre-2	8	10	7	5		
Post-2	8	10	7	6		
Pre-3	8	10				
Post-3	9		8	8		

**Representing data**  
 Represent the data you have collected using an Excel chart and paste below.

**Interpreting and validating the data (Add a comment here)**  
 Student B and C were a bit better.  
**Evaluating** (How does the solution meet needs and consider sustainability?)  
 Did not work very well. I needed to work more.

## Annotations

**1 Annotation 1**  
 Collates some data from pre-tests and post-tests in a table

**2 Annotation 2**  
 Represents data using a side-by-side column graph

**3 Annotation 3**  
 Explains the pre-test and post-test data

**4 Annotation 4**  
 Evaluates the solution and process

# Digital project: Scratch game

## Sample summary

Students designed a game for a buddy using Scratch visual programming language. They selected a challenge from three options and defined the problem. They designed and implemented the digital solution and recorded their development process.

## Achievement standard

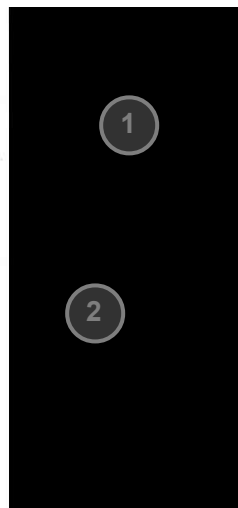
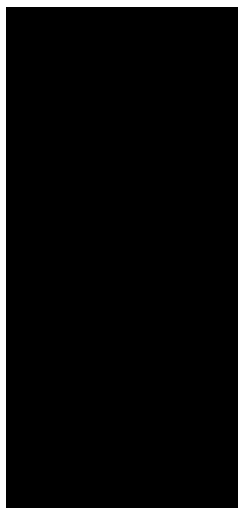
### Subject

### Learning Area

By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. They explain how digital systems use whole numbers as a basis for representing a variety of data types.

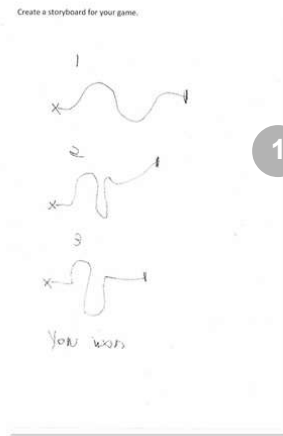
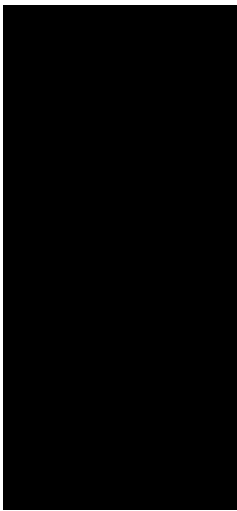
Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. They explain how information systems and their solutions meet needs and consider sustainability. Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols.

### Game development



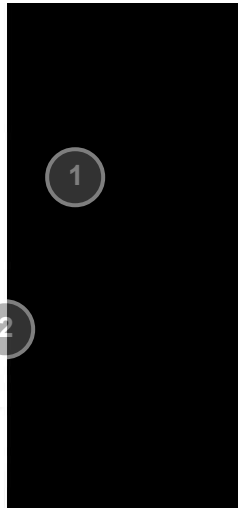
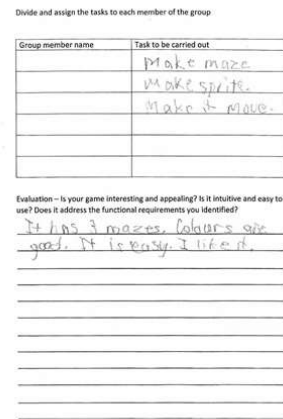
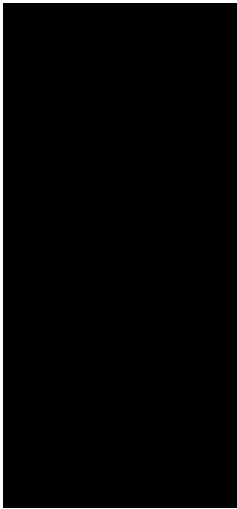
### Annotations

- 1 Annotation 1**  
Provides a brief description of the game
- 2 Annotation 2**  
Writes a simple algorithm for the game



## Annotations

- 1 **Annotation 1**  
Communicates ideas for designing a digital solution by drawing a simple line drawing



## Annotations

- 1 **Annotation 1**  
Identifies steps for creating the game
- 2 **Annotation 2**  
States what they like about the game

## Scratch game



## Presentation: School system

### Sample summary

Throughout the year, students have been using and considering the purpose of a range of digital system components and how these components can be connected. Students were asked to verbally explain and justify the classroom network.

### Achievement standard

#### Subject

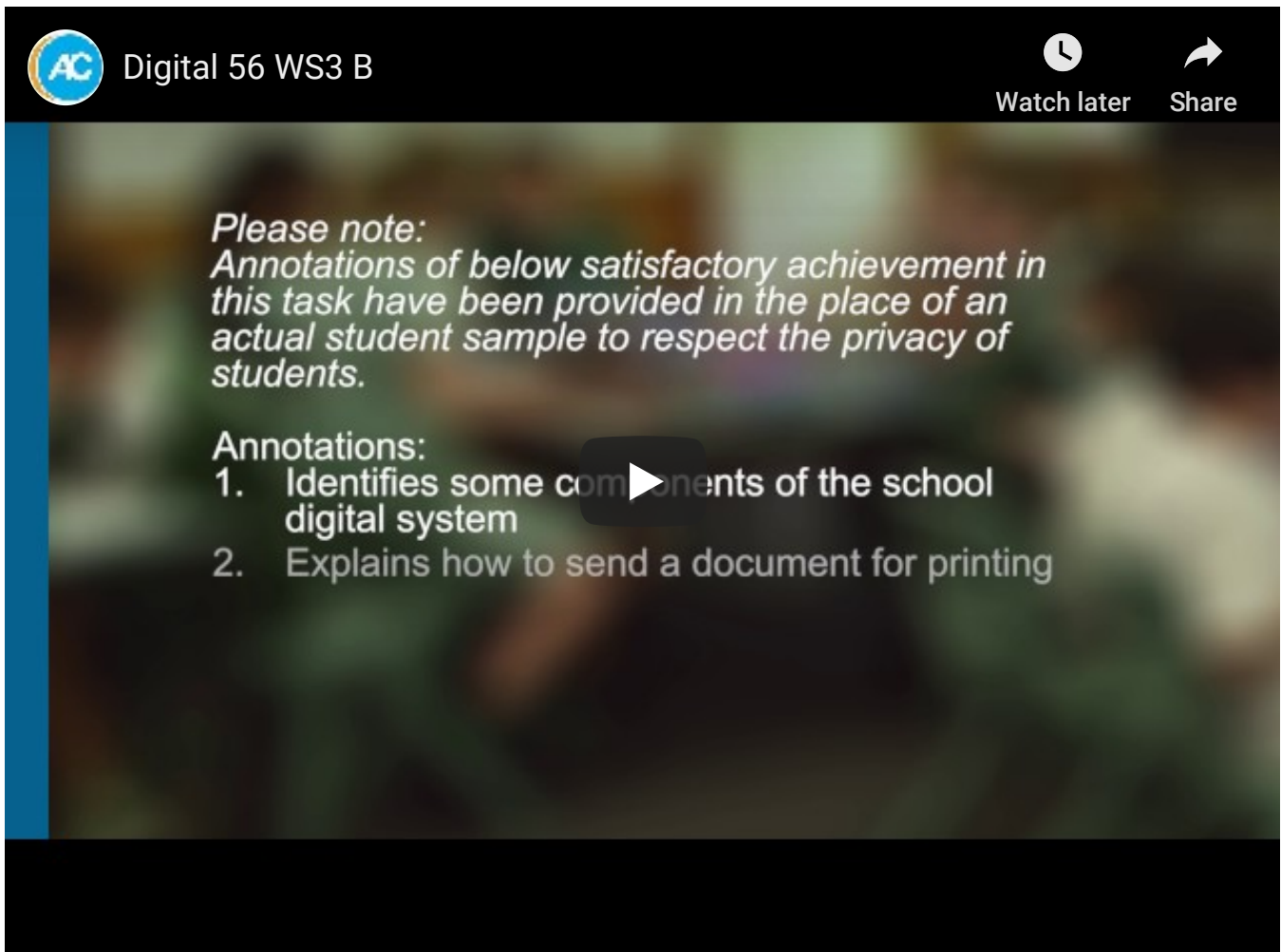
#### Learning Area

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Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. They explain how information systems and their solutions meet needs and consider sustainability. Students

manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols.

### Recorded explanation



AC Digital 56 WS3 B

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*Please note:*  
*Annotations of below satisfactory achievement in this task have been provided in the place of an actual student sample to respect the privacy of students.*

Annotations:

1. Identifies some components of the school digital system
2. Explains how to send a document for printing

## Worksheet: Whole numbers

### Sample summary

Students were introduced to whole numbers using a CS Unplugged video and unplugged group activities. Students completed a worksheet to assess their understanding of binary numbers.

### Achievement standard

#### Subject

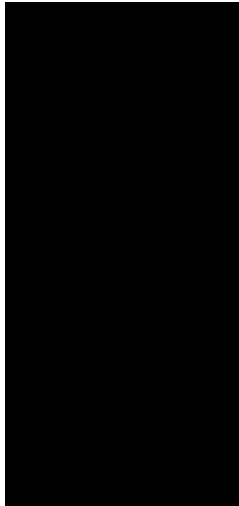
#### Learning Area

By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. They explain how digital systems use whole numbers as a basis for representing a variety of data types.



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## Binary numbers



**Binary Numbers**

What do you notice about the number of dots on the cards?  
*They get bigger*

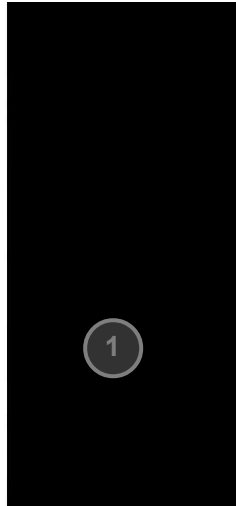
How many dots would the next card have if we carried on to the left? Explain your answer.

How many cards do I need in order to reach a card with 128 dots?

We can use these cards to make numbers by turning some of them face down and adding up the dots that are showing. Be sure to draw all 5 cards, turn over (draw black boxes) for those not needed (See example on the next page).

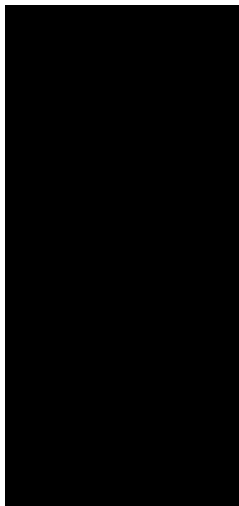
Make 6

Make 15



### Annotations

- 1 **Annotation 1**  
Demonstrates some understanding of the binary number system of 0s and 1s



When a binary number card is not showing, it is represented by a zero. When it is showing, it is represented by a one. This is the binary number system.

0 1 0 0 1 = 9

Make 11001

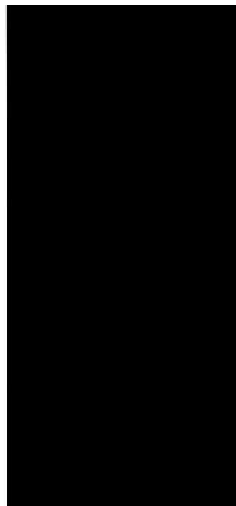
What number is this in decimal?

What would 17 be in binary?  
*10001*

Can you work out what 10101 is?

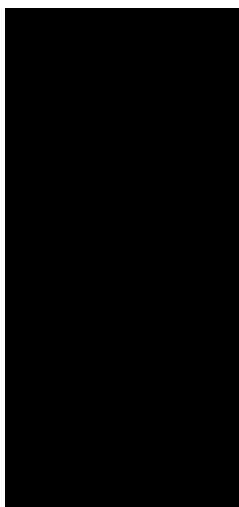
What about 11111?

What day of the month were you born? Write it in binary.  
*2 00010*



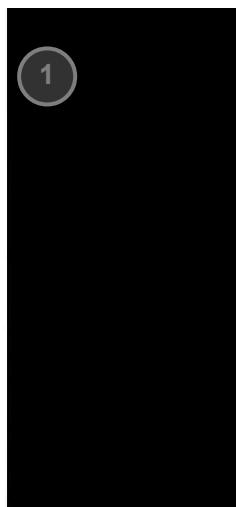
### Annotations

- 1 **Annotation 1**  
Converts decimal to binary



Try to work out these coded numbers:


Why do you think the computer uses binary?  
*1s, 0s, 1s, 0s*



### Annotations

- 1 **Annotation 1**  
Recognises some patterns and records some in binary
- 2 **Annotation 2**  
Identifies a concept relating to binary