

# COUNT ON US SECONDARY CHALLENGE



## IN-SCHOOL TOURNAMENT HANDBOOK

## RUNNING A SCHOOL TOURNAMENT

Once you've implemented the Secondary Challenge activities in school and your pupils are confident and competent, it's time to run a tournament! You could do this either within your own school, or if possible, between a group of schools for example, your most local schools, those in your borough or those in your trust, who are also taking part in the Count on us Challenge.

We very much encourage you to do this so that students get experience of the drama and pressure of a competitive environment, also so you can compare your performance against other schools before the heats and finally to fairly determine the 5 pupils who will be competing on behalf of your school at the Regional Heats. We also hope and expect that everyone will find it a really good and fun experience!



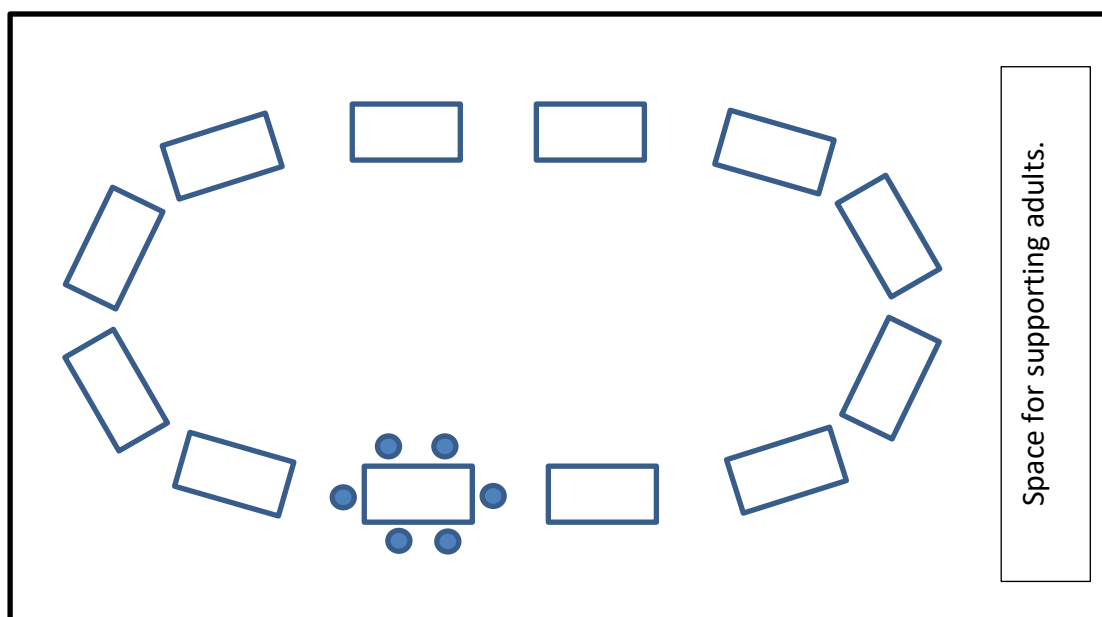
### Benefits of running an in-school tournament:

- Pupils get the chance to practise the activities in a competition setting before the Heats.
- You can determine who should represent your school at the Regional Heats in a fairer way – you might be surprised by who stands out!
- You can make this an event and invite parents to come along and watch.
- It's a great opportunity for personal development – organising an event and making it as fun as possible.
- There is the chance to build community links by reaching out to other schools locally and collaborating.
- Positive stories for your newsletters and communications.
- It's lots of fun!

This booklet is intended to support you to hold an in-school Secondary Challenge tournament, according to Heat rules. You will need to be flexible according to the number of pupils you have participating, the number of staff/adults you have available to help and the space and resources you have.

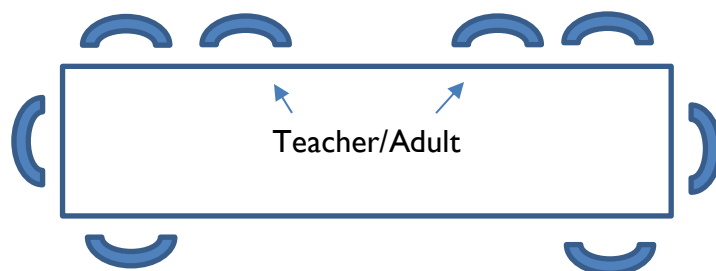
## ORGANISING THE SPACE

1. Ideally you can use the school hall or sports hall or any other large space for a full scale tournament with up to 12 teams. A small scale tournament e.g. with 4 teams, could potentially take place in a large class room.
2. The heats are organised for 12 teams of 5 with extra space for supporting adults. Teams are allocated one table and five chairs and the supporting adults stay away from their teams. One extra chair per table is needed for rounds requiring a judge. Of course, you can vary this according to the number of teams who will be participating in your tournament.



3. In the heats the tables will be arranged in a circle, oval or horseshoe shape with a large space in the middle (e.g. see diagram above). The circular pattern is helpful for movement of pupils during the 24<sup>®</sup> Game round, and the space is needed for the game of Hedgehog and for the theatrical elements of the algebra round.

4. Other arrangements are also fine, however, a space is needed large enough for (i) at least one game of Hedgehog (in the heats there will be two or three at the same time) (ii) sufficient table space for 3 students plus a judge for each team and (iii) a space for all 5 team members of each team to work together during the algebra round. You could, for example use larger tables and have 2 groups of 3 pupils at either end (see diagram below).



5. In the heats we set out 5 chairs for each team away from the playing tables, so that teams can prepare, discuss and organise substitutions. These do not need to be extra chairs as players can take their chair to the playing table when needed. A chair per pupil (+ for every adult who is helping to referee)

**You will need:**

6. Pencils/pens and working out paper for each pupil to use in the Data-Chart-Statistics, GridLines Geometry and Algebra rounds.
7. A flip chart and pens for scoring the Game of Hedgehog round and table referees will need pen and paper for scoring.
8. A projector & screen to show reminders of the rules and to display elements of the algebra round. *It would be possible to print copies of all the activities and leave them on tables if necessary.*
9. A Stopwatch/timer for keeping time in the rounds and something like a hooter or whistle to loudly announce round endings.

## STAFFING

You will need:

- Staff to help set up the hall (or ask your pupils to volunteer!)
- 1 staff member to host (introducing rules & rounds, also be timekeeper)
- 1 staff member/adult helper to referee each team of 3
  - *The ideal solution is to use students who have participated in previous tournaments and are now in older years at school. If you are new to the tournament, sixth formers or older students are also good. Certainly any student teachers within the department should be involved!*
  - *However, if it is not possible to get this staff to student ratio, it may be acceptable to assign a few teams to each available staff member. However, in GridLines Geometry and the 24<sup>®</sup> Game it may be necessary for students to score themselves to some extent (and trusting each other to be correct with their solutions!)*
  - *Another option is that all pupils are given scorecards and have to keep track of their own scores, and these are marked and tallied up afterwards instead of being marked alongside the rounds.*
- Parents/adult/pupil cheerleaders (optional but a great addition!)
- 1 adult looking after refreshments (optional)

## SUGGESTED TOURNAMENT TIMINGS

5 mins	Welcome/Intro	
15 mins	Game of Hedgehog	Round robin tournament (2 mins per game).
20 mins	Geometric Puzzling	15 minute round. 5 for setup.
0 mins	Data-chart-statistics	Done with other rounds.
30 mins	24 <sup>®</sup> Game	5 rounds of 5 mins each plus 5 for set up.
10 mins	Break	
30 mins	Algebra Problem Solving	25 mins. 5 for set up.
10 mins	Results & celebration!	

**Overall:** approx. 2 hours (can be amended as necessary)

- If you have less time you can do fewer rounds of the 24<sup>®</sup>Game or make the puzzling rounds shorter

## RESOURCES AND SET UP FOR THE ROUNDS

The ideal is to create a tournament which matches as closely as possible, the organisation and structure of the heats and finals. To that end, we strongly advise watching the training videos for each of the rounds, which show what they look like and how they work.

To help control and manage your tournament we have provided a PowerPoint presentation that contains reminder of rules and notably key elements of the algebra round. You are welcome to use this as is or modify it to suit your needs. Click [here](#) in a live document to find the presentation.

### 1. Round 1a: The Game of Hedgehog

- Two large (approx. 10cm side length) dice for each game to be played at the same time.
- A large enough space per game, that two teams can play as per the video.

### 2. Round 1b: Data-Chart-Statistics

- One set of 18 cards cut up and placed randomly in a plain envelope, plus an answer sheet, per participating team. See appendix 1 in this document.

### 3. Round 2: Geometry

- In the heats we provide one complete set of GridLines geometry game per team. Each participating school will have 5 sets, so you will have plenty if more than one school is involved. However, if you play within your own school and have lots of teams, you could split up a card set. But, do this with great care (a) so you can put the set back together again afterwards! Also, (b) so that puzzles and numbers are fairly distributed, aim to equalise the different puzzle categories and levels and to share the number cards with similar quantities of each number.

### 4. Round 3: 24® Game

- This round will stretch your resources the most. Again, you will be fine if more than one school is involved, but be careful not to mix the sets.
- It will be necessary to split up the packs so that each team has a few (with a mix of 1-dot, 2-dot and 3-dot cards).
- You will need to use all of the different types: Single Digits, Double Digits, Integers, Fractions & Decimals and Algebra & Exponents

### 5. Round 4: Algebra Problem Solving

- Prepare one envelope per team containing the puzzle sheets and answer sheet found in appendix 2 in this document.
- There are slides in the presentation that accompanies this document that are used during this round.

## MANAGING THE ROUNDS

As far as possible, keep to the timings and structure as suggested so that it closely follows the experience students will have in the heats and finals.

### Round 1a: Game of Hedgehog

- Play with teams of 5 as per the [training video](#).
- Need a judge with a flip chart for scoring. At the end of each game they should keep a record of the teams involved and the points they had at the end of the game.
- You will need a large die for each game ideally one for each team.
- Set up a tournament in which teams play 4 games against as different teams.
- Teams should take it in turns to start, so that every team starts half of their matches.



### Round 1b: Data-Chart-Statistics

- Give out one data-chart-statistics envelope to each team as soon as the Hedgehog round is complete. They need to hand in the completed answer sheet just before the algebra round starts.

### Round 2: Gridlines Geometry

- GridLines Geometry game sets, pens and scrap paper out on tables.
- 3 students are seated at the table together with a judge (2 at the side waiting to be substituted).
- Play the game as per the rules for a 15-minute round with no breaks.
- When a puzzle is solved, players explain the solution to the judge's satisfaction. If correct, the judge keeps the solved card, returns used number cards to the bottom of the pack and deals new cards from the top.
- Teams are free to substitute players at any time, so long as only three players are working at the table at any one time.
- Teams can freely discuss and organise their work as they like.
- At the end of the round, the judge keeps a note of how many puzzles have been solved at each level e.g. 3 level 0, 2 level 1, etc.



## Round 3: 24® Game



- Each table needs a judge who should not be associated with the team they are sitting with. They will need pen and paper for keeping score.
- Each team starts with 3 players. The aim is to move players such that each table has three players from three different teams and that each new round has three different players still from three different teams at each table. Thus, each team will have two players at the side waiting to be substituted.
- The method used in the heat and finals is as follows:
  - Three starting players from the same team members are labelled A, B & C.
  - All 'A' players should stand and move one seat around the ring of tables clockwise (they will end up sitting in another 'A' players' seat)
  - All 'C' players should move one seat around anti-clockwise (they will end up sitting in another 'C' players' seat)
  - 'B' players do not move. Thus, each table has an A, B and C from different teams. This process is repeated for each new round.
- After the 3<sup>rd</sup> round of the 24®Game, 2 people in each team must be substituted. Complete the substitutions before you move players for the next round.
- Pupils play 5 rounds, each of 5 minutes. The coordinator keeps time and give timing guidance e.g. 1 minute left etc. Follow the detailed playing rules in the handbook to be sure students are claiming cards and answering in the correct manner.
- At the end of each round the table judge keeps a record of the teams involved and their position in the round (1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup>) according to the total number of dots on the cards they completed. However, if they did not answer any cards they should not be recorded.
- Example records:
  - team 3 1<sup>st</sup>, team 7 =2<sup>nd</sup>, team 8 = 2<sup>nd</sup> (all players completed cards)
  - team 2 1<sup>st</sup> (they were the only player to complete any cards)
  - team 6 1<sup>st</sup>, team 3 2<sup>nd</sup> (only two players completed any cards)



## Round 4: Algebra Problem Solving

- This is a full team round, all 5 team members should be at their original table. They can work together and distribute the work as they like. One team member is responsible for collecting and handing in items and is allowed to move away from their table.
- The problem is contained in the sheets in the envelope and answers must be written on the answer sheet also in the envelope.
- The round is controlled by the coordinator using the slides in the presentation. The slides have notes to tell you what to do.
- Teams can work continuously for 25 minutes and the coordinator should give timing guidance as the round progresses. Instructions are contained entirely in the materials and no further help should be given.



### Scoring

The coordinator should keep track of the scores for each team as the tournament progresses. In the heats and finals we use a spreadsheet to turn the outcome of each round into a score in points. A spreadsheet for your tournament is available [here](#). When all rounds are completed teams can be rank ordered according to their points totals and the winners will be known! If you are using this to help determine your 5 competitors for the heats, it might be helpful to create individual scorecards so that you can keep track of certain pupils and see who is the strongest and most consistent across all of the rounds.

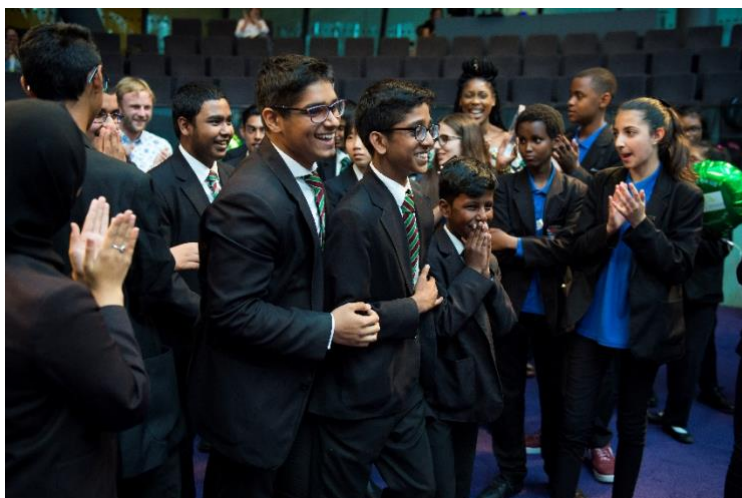
These scores need to be recorded for each team to insert in the spreadsheet:

<b>Game of Hedgehog</b>	<b>Total points scored in games. Number of games won.</b>
<b>Geometric Puzzling</b>	<b>Number of puzzles completed at each level.</b>
<b>Data-chart-statistics</b>	<b>Number of correct sets of 3.</b>
<b>24®Game</b>	<b>Number of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> positions.</b>
<b>Algebra Problem Solving</b>	<b>Number of correct puzzles, equations and extras as per the answer sheet. If completed within the 25 minutes, the order of completing e.g. 1<sup>st</sup>, 2<sup>nd</sup>, etc.</b>

## CELEBRATE!

Competing in a Maths competition can be quite stressful and scary – so make sure you celebrate your pupils' achievements! You could:

- Have some lovely (healthy) treats waiting for them at the end.
- Hand out certificates in assembly and invite parents.
- Make a display board with lots of lovely photos from your tournament.
- Write a story in your school newsletter or local paper.
- If your school has a Twitter account, please do share your photos and Tweet us [@mayorsfund](https://twitter.com/mayorsfund) #JPFSecondaryChallenge #CountOnUs.
- Or you can send your photos to Christian on [cwalker@mayorsfundforlondon.org.uk](mailto:cwalker@mayorsfundforlondon.org.uk)
- If you've booked in your tournament in the diary in advance, why not let us know? We'd love to pop along, take some photos, and speak to some of the children about their experiences! Just email Christian the date and time.



Remember, this is just a guide to help you if you'd like to run a tournament similar to the Heats. Feel free to be creative and adapt the activities and rules to fit your school and your facilities. The most important thing is that your pupils enjoy themselves and they feel empowered to do Maths!

## APPENDIX 1a DATA-CHART-STATISTICS CARDS

<p><b>Data</b> <span style="float: right;">Card D2</span></p> <p>Indicative GHG emissions (KGCO<sub>2</sub>e) for a single passenger, 2021</p>	<p><b>Chart</b> <span style="float: right;">Card C5</span></p>	<p><b>Analysis</b> <span style="float: right;">Card A3</span></p> <p>A single journey from London to Glasgow generates nearly 8 times the emission choosing plane over coach.</p>
<p><b>Data</b> <span style="float: right;">Card D5</span></p> <p>Greenhouse gas emissions by sector, 2019</p>	<p><b>Chart</b> <span style="float: right;">Card C1</span></p>	<p><b>Analysis</b> <span style="float: right;">Card A6</span></p> <p>Transport became the largest emitting sector in 2016. This follows large decreases in energy emissions as the UK switched away from coal power and towards gas, while transport emissions have remained relatively static.</p>
<p><b>Data</b> <span style="float: right;">Card D1</span></p> <p>Greenhouse gas emissions by sector, 2019, by proportion</p>	<p><b>Chart</b> <span style="float: right;">Card C6</span></p>	<p><b>Analysis</b> <span style="float: right;">Card A4</span></p> <p>Transport produced 27% of the UK's total emissions in 2019. Of this, the majority (91%) came from road transport vehicles (111 MtCO<sub>2</sub>e).</p>

<p><b>Data</b> Card D6</p> <p>Greenhouse gas emissions by transport mode, 1990 and 2019</p>	<p><b>Chart</b> Card C4</p> <table border="1"> <caption>Domestic Transport Emissions (MtCO<sub>2</sub>e)</caption> <thead> <tr> <th>Mode</th> <th>1990</th> <th>2019</th> </tr> </thead> <tbody> <tr> <td>Cars &amp; Taxis</td> <td>72</td> <td>68</td> </tr> <tr> <td>HGVs</td> <td>20</td> <td>19</td> </tr> <tr> <td>Vans</td> <td>12</td> <td>19</td> </tr> <tr> <td>Ships</td> <td>9</td> <td>6</td> </tr> <tr> <td>Buses</td> <td>5</td> <td>3</td> </tr> <tr> <td>Other</td> <td>10</td> <td>7</td> </tr> <tr> <td><b>Total</b></td> <td><b>128</b></td> <td><b>122</b></td> </tr> </tbody> </table> <table border="1"> <caption>International Emissions (MtCO<sub>2</sub>e)</caption> <thead> <tr> <th>Mode</th> <th>1990</th> <th>2019</th> </tr> </thead> <tbody> <tr> <td>Int'l Aviation</td> <td>16</td> <td>8</td> </tr> <tr> <td>Int'l Shipping</td> <td>8</td> <td>8</td> </tr> <tr> <td><b>Total</b></td> <td><b>37</b></td> <td><b>8</b></td> </tr> </tbody> </table>	Mode	1990	2019	Cars & Taxis	72	68	HGVs	20	19	Vans	12	19	Ships	9	6	Buses	5	3	Other	10	7	<b>Total</b>	<b>128</b>	<b>122</b>	Mode	1990	2019	Int'l Aviation	16	8	Int'l Shipping	8	8	<b>Total</b>	<b>37</b>	<b>8</b>	<p><b>Analysis</b> Card A2</p> <p>Improved fuel efficiency of cars has generally seen emissions from cars decrease between 1990 to 2019. Bus emissions have also decreased in this period. However, van emissions have increased by 8 MtCO<sub>2</sub>e since 1990. From 1990 to 2019, International Aviation emissions have more than doubled.</p>
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<p><b>Data</b> Card D4</p> <p>CO<sub>2</sub> emissions from transport by local authority, 2019</p>	<p><b>Chart</b> Card C2</p> <p>CO<sub>2</sub> Kilotonnes</p> <ul style="list-style-type: none"> <li>0 to 300</li> <li>300 to 600</li> <li>600 to 1,200</li> <li>1,200 to 1,500</li> <li>1,500 to 1,800</li> </ul>	<p><b>Analysis</b> Card A5</p> <p>High levels of emissions can be found in urban areas such as Leeds and Birmingham as well as more rural areas such as Cornwall, Wiltshire and Shropshire.</p>																																				

**Note: the lines as set out here are correct. So, they must be placed randomly in the envelope!**

## APPENDIX 1b DATA-CHART-STATISTICS ANSWER SHEET

Team Name .....

Write the card name e.g. C4 or C2 for the chart, A1 or A6 for the analysis in the correct line in the table to match the Data card.

Data	Chart	Analysis
D1		
D2		
D3		
D4		
D5		
D6		

## APPENDIX 2 ALGEBRA ROUND PACK

Print one copy of each sheet and place it into an A5 envelope enough for one for each participating team.

These should be ready to hand for the event co-ordinator at the start of the algebra round.

# Count on us Secondary Challenge School Tournament

## Algebra Round answer Sheet

Team name .....

### *Bridge and Map Puzzles*

Clue	Solution ( $x$ )	Letter from Clue
First bridge		
Second bridge		
Third bridge		
Fourth bridge		
Fifth bridge		
Sixth bridge		
Name of the river		
Seventh bridge		

Answer: (Holme's most deadly enemy)

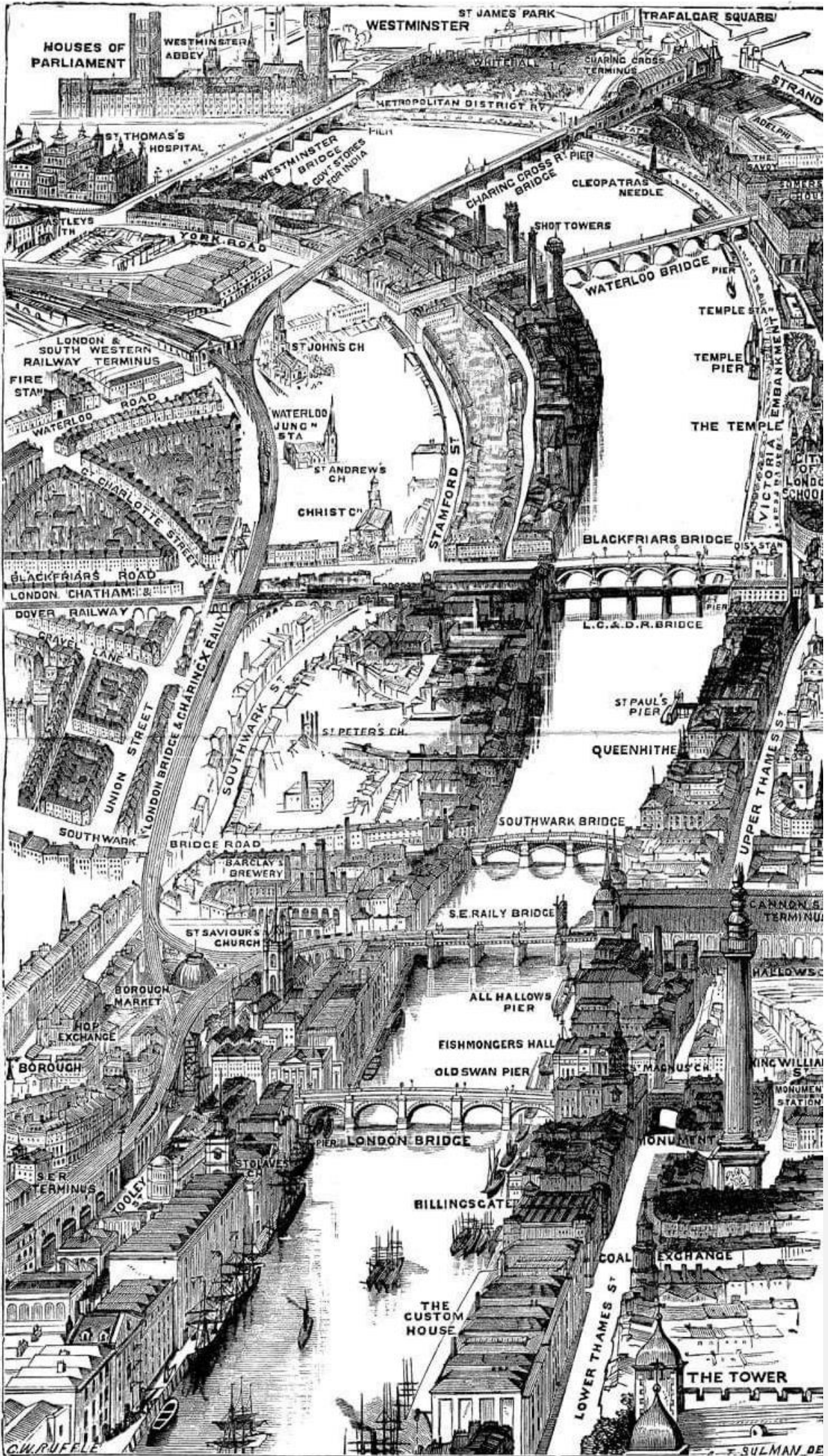
.....

### *Puzzles on screen #1: location of the battle*

.....

### *Puzzles on screen #2: Phone number of Scotland Yard*

.....





I say Watson, this map has the name of my most deadly enemy encoded in it.  
Can you work out who they are?



Look at the bridges in order starting from the houses of Parliament.  
Make sure you can find them all!

The value of  $x$  in each equation tells you the position of the letter in the name of the bridge with one clue different!

The first bridge ... position of letter:  $3x + 2 = 17$

The second bridge ... position of letter:  $x^3 - 1 = 999$

The third bridge ... position of letter:  $7x - 19 = 3x + 1$

The fourth bridge ... position of letter:  $\frac{5x+16}{x} = 7$

The fifth bridge ... position of letter:  $f(7)$  when  $f(x) = 5x - 32$

The sixth bridge ... position of letter: 1, 1, 2, 3, 5,  $x$ , 13, ...

The  $x = 238^0$  letter in the name of the river

The seventh bridge ... position of letter:  $a^3 \times a^5 \div a = a^x$

When you have finished ALL the puzzles on this sheet and on both screens, hand your completed answer sheet to the coordinator.  
Be sure you have answered everything, you cannot get it back!

# Count on us Secondary Challenge School Tournament

## Algebra Round Answer Sheet for Marking

Team name .....

### *Bridge and Map Puzzles*

Clue	Solution ( $x$ )	Letter from Clue
First bridge	5	M
Second bridge	10	O
Third bridge	5	R
Fourth bridge	8	I
Fifth bridge	3	A
Sixth bridge	8	R
Name of the river	1	T
Seventh bridge	7	Y

Answer: (Holme's most deadly enemy)

## MORIARTY

*Puzzles on screen #1: location of the battle*

## 221b Baker Street

*Puzzles on screen #2: Phone number of Scotland Yard*

1      2      1      2