



Estimathon

Interested in running an Estimathon contest at your school? Here are some pointers for putting together your first contest.

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What you'll need

The Estimation is a team-based contest that combines trivia, game theory, and mathematical thinking. Teams have 30 minutes to work on a set of 13 estimation problems. The team with the best estimates wins!

1. A moderator

That's you! (Presumably.)

2. Players

There are no limits on the number of players or teams, but we suggest aiming for 4–10 teams with 3–8 players per team. Keep in mind: The difficulty of grading answer slips will increase in direct proportion to the number of teams in the contest.

3. A copy of the rules

It's important for each player to understand [the rules](#).

4. Questions

An Estimation contest has 13 questions. Each team will work on the same set of questions. The moderator will pick the questions and create a handout for players to refer to during the contest. The subjects and difficulty levels of the questions are completely up to you, but all answers must be positive.

We have sample questions available for inspiration, but you should feel free to exercise some creativity and make your own.

5. Answer slips

You will need 18 answer slips per team. If you want, we can send you some in the mail. Alternatively, you can use the template [here](#) and print them out on your own.

6. A score sheet

One of the central components of the contest is the score sheet. It should be graded in real time as teams submit intervals (answer slips) for the various questions.



We have a [score sheet template](#) that you can use if you'd like.

If you plan on having multiple graders for your contest, make sure to share your copy of the score sheet. We recommend you confirm beforehand that each of your graders can access and edit the score sheet.

7. A timer

Once the moderator says “GO!”, teams will have 30 minutes to work on the 13 questions. It is the moderator’s responsibility to keep track of the clock and issue periodic “time remaining” alerts to the teams.

8. At least one grader

You will need at least one person to grade answer slips as they are submitted. Grading is a manual process and how many graders you need can vary by how fast your graders are. If you have never run or graded an Estimathon before, we recommend having one grader for every three teams.¹

Graders should be provided with copies of the answers. (It can't hurt to give them copies of the problems, too.) If you are planning on using a shared Google sheet to score your Estimathon, make sure all the graders have separate computers and can successfully open and edit the sheet. Graders may want to have calculators handy as well.

When it comes to grading the answer slips during the Estimathon contest:

- If an answer slip is **good** (i.e., the interval contains the correct answer), the score for that interval is $\text{FLOOR}(\text{max}/\text{min})$. Enter this value in the corresponding row (team) and column (problem #) of the score sheet.
 - *Example 1:*
If the answer to a problem is 10, then an interval of [5, 30] would score $\text{FLOOR}(30/5) = 6$ points.
 - *Example 2:*
If the answer to a problem is 10, then an interval of [6, 11] would score $\text{FLOOR}(11/6) = 1$ point.

¹ In reality, the “graders per teams” ratio can vary a lot depending on how fast your graders are. An exceptionally quick grader might be able to handle an 8-team (or even a 10-team) contest alone, but will almost certainly struggle to keep up with the pace of answer slips for larger numbers of teams. First-time graders may struggle with as few as four teams, especially in the last minutes of the Estimathon, when the rate of team-submitted answer slips is often at its highest



- If an answer slip is **bad** (i.e., the interval does not contain the correct answer), enter an X in the corresponding row and column.
 - In the event that a team gets a problem wrong multiple times in a row, we recommend using a “multiple X” notation. So, an XX would signify that a team had gotten a given problem wrong twice in a row.
 - The “multiple X” notation doesn’t affect a team’s score—it counts the same as a single X—but it does let the team know that its most recent answer slip has been graded.

Timeline

Things to do ahead of time.

- Write questions, get answer slips, send out the contest rules, recruit graders if necessary.
- Get your score sheet ready and confirm all graders can successfully open and edit the score sheet.

OK, students have arrived, now what?

Are they divided into teams yet? If not, now is a good time to do that.

- Encourage teams to come up with team names!
- Collect team names, enter them onto the score sheet.
- Give each team a packet of 18 answer slips.

At this point you are now about to hand out the 13 questions and start the contest. At your discretion, you may choose to do any of the following.²

- Recap the contest rules, or ask if anyone has any final questions regarding the rules.
- Remind students they may not use calculators, smartphones, etc. Put that stuff away!

Time to get started

Hand out the questions, face down. Once this is done, tell students they can open the problems and get started. Don't forget to start the timer!

The Estimation is underway!

Don't be surprised if no answer slips are submitted within the first few minutes.

For groups of students who have never played before, the rate of submitting answer slips tends to be very sparse in the first 10 minutes and heavy in the last 10 minutes. For more experienced groups of students, the rate of submitting answer slips tends to be more evenly distributed across the 30 minutes.

Try to keep up with the pace of answer slips. If your graders are struggling to keep up

² When Jane Street runs Estimathons, we tend to do all of these “final checks” before beginning the contest.

with the rate of answer slips, you may want to announce that “live scoring updates are temporarily unavailable.”

Time's up!

There is often a rush of teams submitting answer slips in the last moments of an Estimation. It may take a few extra minutes of grading to work through these. Once grading is complete, it's time to read out the answers to the 13 questions and congratulate the winners!

Sample questions

The following list is meant to illustrate the breadth of topics and approximate “degree of difficulty” for questions we use in Estimathons with college students.

- The furthest possible distance one can be (on Earth) from the nearest landmass, in miles.
- The number of goals scored during the 2018 MLS regular season.
- The number of rivets in the Golden Gate Bridge.
- The number of missed free throws in Shaquille O'Neal's NBA career.
- The domestic box office of *Gone With the Wind*, in dollars. (Unadjusted for inflation.)
- The number of pages in the Esperanto-language Wikipedia.
- The standard boiling point of hydrogen, in degrees Kelvin.
- The number of primes less than 1 million that can be expressed as the sum of two squares.
- The number of followers Lady Gaga has on Instagram.
- The number of stations in the entire Tokyo subway system.
- The weight of the Empire State Building, in tons.
- The total number of points scored on the 2019 Putnam Exam.
- The number of times the word “maybe” occurs in the lyrics of “Call Me Maybe.”
- The current distance between Mars and Jupiter, in miles.
- The number of pennies minted in 2018.
- The volume of the Earth's oceans, in cubic miles.
- The number of Boeing 747's ever built.
- The population of Las Vegas, NV, as of the 1940 census.
- The number of digits in the largest known perfect number.
- The margin of victory in the popular vote of the 1960 U.S. presidential election.
- The number of calories you'd be eating if you had “one of everything” from the Taco Bell menu.
- The number of integers between 1 and 1,000,000 that can be represented as the product of two palindromes.
- The number of square meters a gallon of paint typically covers.
- The mass, in kilograms, of the International Space Station.
- The length of the shortest border any country shares with Russia, in miles.
- The number of people to set foot on Antarctica in 2019.
- The total amount of wiring in the original Apollo command module, in feet.
- The total number of runs scored at the 2019 Cricket World Cup.

