Event Rules

Event Blocks

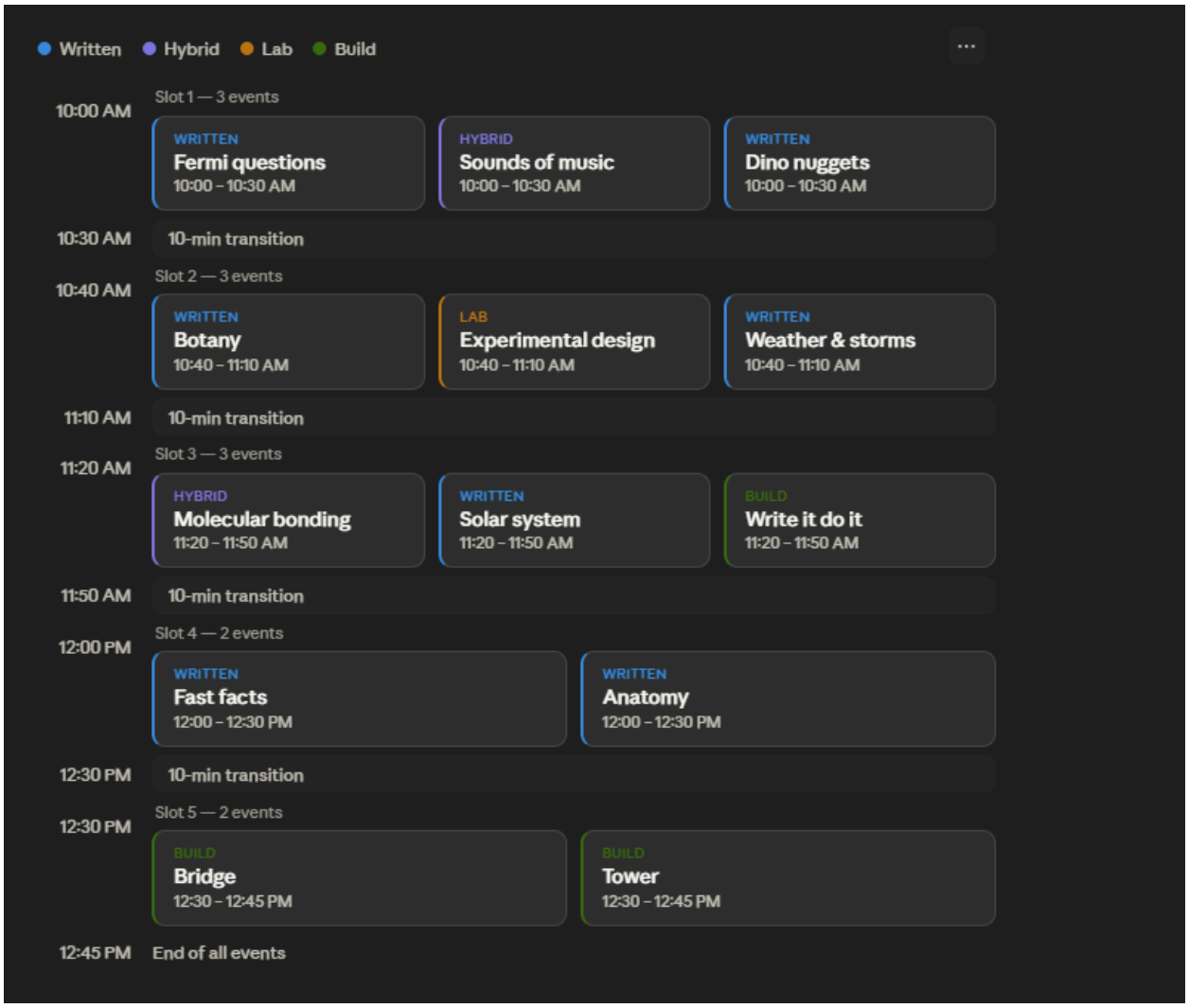

Table of contents:

7. Fermi Questions (written)
8. Molecular bonding (written)
9. Solar system (written)
10. Sounds of music (written)
11. Tower (build)
12. Weather storms (written)
13. Write it do it (build)

Anatomy (written)

Teams of 2 students

30 minutes

Only materials allowed are writing utensils

Teams will be asked to label diagrams about parts in the body that are part of the skeletal system and bones in general. Questions will be diagrams about bones, their structure, as well as facts about bones such as composition, types of bones, growth and development, and diseases.

Scoring will be based on correct answers and the highest score wins.

Resources:
Medical News Today
Kids Health- Bones
Better Healthy Channel - Bones
Look for examples of diagrams on google

Bridge (build)

Team of 2 Students
50 minutes

Goal: Each team **will design and construct a 30 cm truss bridge at home that achieves the highest possible efficiency score by balancing strength and weight**, while also demonstrating clear justification of design choices, teamwork, and problem-solving strategies.

Rules

1. The bridge must be a truss design and measure approximately 30 cm in length.
2. Bridges will be brought to the competition fully built and will be tested for load capacity and weighed to calculate efficiency.
3. Teams must be prepared for a justification of their design choices to judges later in the day.

Suggested Materials to Build at Home:

- Popsicle sticks
- Wood glue (fast drying) / super glue
- Scissors
- Ruler

Efficiency Score (80% of the score) = Maximum Load Supported / Bridge Weight Highest Efficiency Score wins The load is going to be placed on top of the bridge on competition day. Judges will keep adding weight until the bridge breaks.

Justification Score (20% of the score): After bringing their bridge in the morning, teams will present it to the judges at the end of the competition day (different slot) and justify:

- Why did they use that type of truss bridge?
- How did you plan your build time across three weeks?
- How did you ensure stability and balance across the span?

They will be scored based on how well they justified their answers. Efficiency score and justification scores will be combined.

Resources:
Truss Bridge Types
Search Youtube Videos

Botany (Written)

Team of 2 students
30 minutes
Can bring 2 pages of notes

Teams will be asked to identify plants (list below) as well as questions about the needed environment for each plant. They must also beagle to answer questions on how the plant collects nutrients,how photosynthesis works,and cell structure of plants.

Douglas Fir (*Pseudotsuga menziesii*) **Western Red Cedar** (*Thuja plicata*) **Bigleaf Maple** (*Acer macrophyllum*) **Sword Fern** (*Polystichum munitum*)	**Coast Redwood** (*Sequoia sempervirens*) **Giant Sequoia** (*Sequoiadendron giganteum*) **California Poppy** (*Eschscholzia californica*) **Joshua Tree** (*Yucca brevifolia*) **Chaparral Shrub (Chamise)**	**Red Mangrove** (*Rhizophora mangle*) **Saw Palmetto** (*Serenoa repens*) **Live Oak** (*Quercus virginiana*) **Spanish Moss** (*Tillandsia usneoides*) **Bald Cypress** (*Taxodium*

Salmonberry (*Rubus spectabilis*)	(*Adenostoma fasciculatum*)	*distichum*)

Dino nuggets (written)

Teams of 2 students
30 minutes
Up to 10 pages of notes double sides on 8.5x11 paper and a pencil

Teams will have to identify fossils of dinosaurs from the list and answer some questions about each specimen and fossils in general. Question will be about topics such as: scientific names, identification based on pictures, what period it lived in, its diet, its hunting behavior, how did they protect themselves from predators, how did it walk (biped or quadraped), what was its habitat, how did they protect their young, how fossils are made, where to find fossils.

• Tyrannosaurus rex • Triceratops • Velociraptor • Stegosaurus • Brachiosaurus • Allosaurus • Spinosaurus	• Diplodocus • Ankylosaurus • Parasaurolophus • Apatosaurus • Pachycephalosaurus • Iguanodon • Giganotosaurus • Deinonychus

Resources :

- National Parks Service - Fossils
- Smithsonian National Museum of Natural History - Paleontology
- Dino Directory – Natural History Museum (London)

Experimental design (lab)

Teams of 2 students
30 minutes
No notes only pencils
The test will consist of two parts administered sequentially.

Part 1:
Part 1 will include:

- General questions related to laboratory safety
- Questions on experimental design
- A hypothetical experiment, including a provided research question and materials list

Competitors will respond based on scientific reasoning and prior knowledge.

Part 2:
After the completion of the 20-minute Part I, competitors will be provided with Part II of the test.

Part 2 will include:

- Experimental data generated using the same research question and materials provided in Part I
- Analysis-based questions
- A written Claim–Evidence–Reasoning (CER) response

Responses in Part I are **not required** to match the data provided in Part II.

Required Knowledge and Skills

- Basic science concepts
- Calculating mean (average), median, and mode
- Interpreting and analyzing various types of graphs
- Writing a clear and well-supported CER response

Fast facts (written)

Teams of 2 students
30 minutes
No notes, only pencils
Teams will be given a few letters and have to fill out a word that starts with that letter in the topics such as Elements on the periodic table,Famous Scientists, Animals, Plants, body parts, dinosaurs,rocks,and objects in our solar system. (there will be no other topics)
They will rotate between stations every 5 minutes, and change test sheets, they must turn in their test sheet before moving on.

Test sheet example:

letter	Elements	Animal	bodyparts	Famous scientist
a				
e				
f				

The number points you get is (# correct answers in row 1)^2 + (# correct answers in row 2)^2 +(# correct answers in row 3)^2
+2 points for every unique answer
Resources:

- Search Quizlet
- Flash cards are also very helpful

Fermi Questions (knowledge)

DESCRIPTION: Teams shall solve estimation questions that involve comparing everyday objects and large-scale structures, distances, or quantities.

A TEAM OF UP TO: 2 competitors.

APPROXIMATE TIME: 30 minutes.

THE COMPETITION:
a. Teams shall answer Fermi-style estimation questions.
b. Questions shall require estimating quantities such as height, length, area, volume, or count (e.g., stacking objects to match a structure's height).
c. Exact answers are not required.

REQUIRED ACTIONS:
a. Teams shall show calculations or logical reasoning.
b. A final numerical estimate shall be provided for each question.

TIEBREAKERS:
a. Highest total reasoning score.
b. Highest score on the final question.

EVENT PARAMETERS:
a. Each team may use writing utensils, a non-programmable calculator, and an index card (size 3x5 inch) to write calculation conversions if they would like.
b. Reference materials, notes, phones, internet access, and programmable calculators are prohibited.
c. Use of prohibited materials may result in disqualification.

Molecular bonding (Test)

Teams of 2 students

30 minutes

Only materials allowed are writing utensils

Teams will be asked to give a simple written test about molecular bonding (Ionic,Metalic,Covalent), common compounds, identification of common molecules, structure of atoms, drawing lewis dot models, basic attraction according to Coulomb's law. There will also be identification of common compounds on the test where teams will be shown a picture and they have to identify it.

Scoring will be based on correct answers and the highest score wins.

Resources:
Look for examples of common molecules on google
Britannica kids
Lots of youtube videos available online- Organic Chemistry Tutor
Khan Academy

Solar system (written)

Teams of 2 students
30 minutes
3 sheets of 8.5x11 paper for notes and a pencil
Teams will have to identify planets and dwarf planets in our solar system as well as answering a few questions about them.
There will be 3 tie-breaker questions that will be above the level
Identification list:

Planets	**Dwarf planets**	**Moons**
• Mercury • Venus • Mars • Saturn • Jupiter • Uranus • Neptune	• Pluto • Eris • Ceres • Haumea • Makemake • Sedna • Orcus • Quaoar • Gonggong • Varuna	• Ganymede (Jupiter) • Titan (Saturn) • Callisto (Jupiter) • Io (Jupiter) • Europa (Jupiter) • The Moon (Earth) • Enceladus (Saturn) • Triton (Neptune) • Rhea (Saturn) • Oberon (Uranus)

Resources:

- Solar System | NASA Space Place – NASA Science for Kids
- SolarBalls youtube
- Astronomy: The Solar System

Sounds of music (test)

Team of 2 students
30 minutes
4 sheets of 8.5 x 11 of notes (2 pages front + back)

The test will include:

- **Multiple-choice questions**
- **Matching and labeling**
- **Short written answers**
- **Diagram interpretation**

Topics include:

Sound basics: vibration, pitch, volume, frequency, amplitude

Instrument families: string, wind, percussion

Wave properties: wavelength, speed, resonance

How sound travels: through solids, liquids, gases

Musical concepts: scales, rhythm, harmony (basic level)

Famous composers

Resources:

Sounds of Music Quizlet

Famous Composers

Musical Concepts

Sound terms

The movie Sound of music songs

Tower (build)

Team of 2 Students
50 minutes

Goal: Each team **will design and construct a freestanding tower at least 30 cm tall at home that achieves the highest possible efficiency score by balancing strength and weight**, while also demonstrating clear justification of design choices, teamwork, and problem-solving strategies.

Rules

1. The tower must be freestanding and at least 30 cm tall.
2. Towers will be brought to the competition fully built and will be tested for load capacity and weighed to calculate efficiency.
3. Teams must be prepared for a justification of their design choices to judges

Suggested Materials to Build at Home:

- Popsicle sticks
- Wood glue (fast drying) / super glue
- X-acto knife
- Ruler

Efficiency Score (80% of the score) = Maximum Load Supported / Tower Weight Highest Efficiency Score wins The load is going to be placed on top of the tower on competition day. Judges will keep adding weight until the tower breaks.

Justification Score (20% of the score): After bringing their tower in the morning, teams will present it to the judges at the end of the competition day (different slot) and justify:

- Why did you choose that tower truss structure (e.g., triangular base, cross-bracing)?
- How did you plan your build time across three weeks?
- How did you ensure stability and balance as the tower got taller?

They will be scored based on how well they justified their answers. Efficiency score and justification scores will be combined.

Resources:
Search Youtube Videos
Tower Truss Structures

Weather storms (written

Weather storms (written)

Teams of 2 students
30 minutes
4 sheets of 8.5x11 paper for notes (2 pages front + back)

The test will include:

- **Multiple-choice questions**
- **Matching and labeling**
- **Short written answers**
- **Diagram interpretation**

Topics include:

- Types of storms (thunderstorms, hurricanes, tornadoes, blizzards)
- Weather tools (thermometer, barometer, anemometer, rain gauge)
- Cloud types and what they mean
- Storm safety and emergency preparedness
- Water cycle and how it affects the weather
- Seasonal weather patterns

Resources:
NASA Space Place Weather
National Weather Service – Owlie Skywarn
SciJinks – Weather for Kids
Weather Wiz Kids

Write it do it (build)

Duplo blocks, popsicle sticks, plastic cups ,paper, binder clips.
Teams of 2 students
30 minutes (15 for writer, 15 for doer)

One person from the pair (writer) will have a build to write a description about (build will be made from these materials: Duplo blocks, popsicle sticks, plastic cups ,paper, binder clips). The writer cannot touch the object or modify it in any way. The writer has 15 minutes to write their description. Once they are done or time has run out, proctors will pass the descriptions to the doer.

- Drawings and diagrams of the model or any part of the model are not allowed
- Numbers, words, abbreviations (will not have to explain them), scientific symbols, punctuation, and editing are allowed

The doer will have 15 minutes to construct the build based on what the writer told them.

Scoring:

- The team which builds their build closest to the model and has a description that does not break the rules will be declared the winner
- Each individual piece will receive points (place, color, orientation, size)
- Teams who drew a part of the build will be placed in tier 2. Teams who drew the whole model will be disqualified
- Timing of the builder will be used as a tiebreaker.