Rules and Regulations of the Tournament

General
The Shalhevet Freier Physics Tournament is an annual tournament between high-school teams. The tournament is a memorial to Shalhevet Fryer who served as the Head of the Committee for the Advancement of Youth Science Education from 1994-1998. Throughout the tournament the participants gain experience in building systems that they invent based on principles of Physics. The competition is open to pupils in 11th and 12th grade who are studying Physics at a high level in high-school. The participants will work in teams of up to five students. Each team will appoint a student to represent the team who will coordinate with the tournament coordinators, Physicists from the Weizmann Institute. The teams need to plan, build and operate the locking mechanism of the safe that will work on the basis of Physics principles.

The participants will be required to try and break into other teams' safes. Every team will include no more than five students.

Guidelines for planning and building a "safe" (60cm x 30cm x 40cm ~ 24" x 12" x 16") consisting of a wooden box with a transparent door that closes with an off-the-shelf electro-mechanical locking device.

1. **The Physics concept**
   - The opening mechanism of the safe should be bases on the Physics concept that is taken from the teaching material from school within the list of topics.
   - Use of concepts that are not included in this list will require authorization from the scientific organizers and an explanation of the concept on the body of the safe.
   - The opening mechanism of the safe should be based on the solution of a Physics problem that can be solved within 10 minutes. The solution should not be trivial (according to the judgment of the coordinators).
   - The safe should include no more than two Physics riddles.
   - The safe should be built such that the locking mechanism is visible to the eye. Hidden parts of the mechanism need to be detailed in a sketch and this needs to be authorized by the scientific coordinator.

2. **Reversibility?**
The possibility of making an irreversible action should be avoided, so that an unlimited number of break in attempts can be made.

3. **Robustness and reliability**
The safe needs to be sturdy and reliable so that a number of attempts to break in to it can be made and it will open only according to the correct and planned actions.

4. **Safety**
The safe needs to be safe and not cause any harm or health danger what so ever to the user. Any use of strong forces / tension, gas, chemical compounds or any other potentially dangerous item requires the prior and early authorization of the coordinator.
5. **Simple maintenance**
The maintenance of the safe and setting it back into the locked state after breaking in needs to be simple to perform within five minutes. There should also be an option to open the safe quickly without needing to solve any Physics problem to allow maintenance of the safe.

**Scoring of the safe**
The scoring of the safe will be determined on the basis of the weighted average of four components:
1. **The scores of the senior team of judges**

   A typical team of judges will consist of a senior Physicist, a Physics teacher and a Physics PhD student. The team will check every safe and interview the group that built each safe and will check how it works. The judges are entitled to check the understanding of the participants of the relevant theoretical material underlying the locking mechanism and the structure of the safe. The score that is awarded will be 45% of the final grade.

2. **Assessment of the pupils**

   The pupils that are dealing with the breaking in to the safes will name the top five safes in their opinion. On the basis of these assessments a score will be calculated that will be worth 20% of the final grade.

3. **The number of successful break-ins of the team into other teams’ safes**

   This score will give 25% of the final grade.

4. **The number of incidents that the safe withheld an attempted break-in**

   This score will give 10% of the final grade.

**The criteria of the senior judging team:**

1. **The essence of the theoretical Physics concept**
2. **The correct and original use of the Physics concept (application)**
3. **The quality of the building (aesthetics and operation)**
4. **The degree of sophistication and the difficulty in solving the Physics problem**
5. **Theoretical understanding of the scientific and technological aspects to the structure of the mechanism and its operation**