

BIOPHYSICS

1. **DESCRIPTION:** Participants will be tested on their knowledge of biology and physics, and their ability to apply physics to biological problems.

A TEAM OF UP TO: 2

APPROXIMATE TIME/EVENT TIME: 50 minutes

2. **EVENT PARAMETERS:**

- a. Each team may bring one 8.5" x 11" sheet of paper that may contain information on both sides in any form and from any source.
- b. Each team may bring two stand-alone calculators of any type dedicated to computation to use during the event.
- c. The Event Supervisor will provide a physics equation and constants sheet.
<https://secure-media.collegeboard.org/digitalServices/pdf/ap/physics-c-tables-and-equations-list.pdf>

3. **THE COMPETITION:**

- a. This event will test participants' knowledge of biology and physics.
- b. Biology topics may include but are not limited to:
 - i. Animal and plant physiology
 - ii. Molecular and cell biology
 - iii. Biotechnology
- c. Physics topics may include but are not limited to:
 - i. Mechanics
 - ii. Fluids
 - iii. Electricity and magnetism

4. **SAMPLE TASKS/STATIONS/QUESTIONS:**

- a. Consider a blood transfusion via IV catheter. Given pressure, viscosity, length, and target flow rate, determine the radius of the catheter required.
- b. If the fluid were Ringer's lactate solution instead of blood, by how much would the flow rate be increased or decreased? Ringer's lactate solution is 4 times less viscous than blood.

5. **SCORING:**

- a. The highest score wins. All questions will be assigned a predetermined number of points.
- b. Selected questions will be used to break ties.
- c. Time will not be a tie breaker.

6. **RECOMMENDED RESOURCES:**

- a. Campbell Biology
- b. Hyperphysics (<http://hyperphysics.phy-astr.gsu.edu/hbase/index.html>)