



**Del Norte High School Science Olympiad
2009-2010 Event Descriptions**

Anatomy & Physiology (have sample rules)

Min 2 people per team

- Human anatomy
- Limited to 2 major body system
 - For example: Skeletal: surface anatomy of bones, structure and function of joints, structure of bones, type of vertebrae, diseases, effect of exercise, arthritis, gout, treatments.
- Divide course work among the two team members.
- 50 minute exam
- Desired to be an MD, sports medicine, this is a good fit.

Cell Biology

Min 2 people per team

- All about cells
- Written test
- Eukaryotic and Prokaryotic cells
- Cell structure, DNA, sequencing, DNA finger printing, immunology
- Prepare study guide for future years.
- Possible paring with Disease Detective.
- Must work well with partner.
- Timed station testing
- Lots of studying.
- Study guide may be allowed, but must be organized
- AP biology and college text books for great reference.

Disease Detective (have sample rules)

Min 2 people per team

- Population growth
- Scientific study of disease, injury, health and disability. Presented with a public health problem.
- Communicate results. Hypothesis, evaluate data, indentify patterns, factors, interventions, risk analysis, generate public message.
- Divide areas of expertise to more efficient with time
- Good analytical writing skills needed. Broad use of health terms.
- Possible same people doing Ecology
- 50 minute exam
- Want to be Dr. Gupta from CNN?

Ecology (have sample rules)

Min 1 person per team

- North American biomes.
- Calculator required
- Station to station testing
- Define variables, analyze, presenting in graphs/tables, hypothesis, calculations and predictions.
- Divide course work in the two domains being tested on if 2 people.
- Nutrient cycle, population dynamics, growth, human impact, alternative energy
- Possible same people doing Disease Detective.
- 50 minute exam

Ornithology

Min 1 person per team

- New event
- Study of birds
- Likely identification of species
- Location of species
- Characteristics of species
- Prepare study guide for future years.
- If you like birds, be the first to sign up.

Astronomy

Min 2 people per team

- Basic knowledge of stellar properties, evolution, stars, galaxies.



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- Allowed 1 page of notes.
- Good note taker, well organized person
- Identification, H-R diagrams.
- Hands-on interpretative testing.
- Lots of Internet work to categorize in detail a binder that can be used for future years.
- 50 minute exam

Dynamic Planet (have sample rules)

Min 2 people per team

- Earthquakes and volcanoes
- Observation, classification, measuring, inferring, predicting and references.
- Divide work between both members. Teach the other member.
- Allowed to bring in 1 page of notes (good eyesight required)
- Lots of independent work required. Expected to expand study guide for future years.
- 50 minute exam

Fossils (have sample rules)

Min 2 people per team

- Timed station testing
- Can bring magnify glass, field guide, 3-ring binder with unlimited notes.
- Fossil specimens typically given for regional (and must be returned)
- Lots on Internet work and collating. The binder should be something to share for future years. Each page should reference source.
- Identification, sort by age, original environment.
- Lots of preparation should be able to reference material quickly.
- Need organized, quick reference, self study, able to keep notebook to be used in future years.
- 50 minute exam

Remote Sensing

Min 1 person per team

- Notes allowed 5 pages.
- Global warming
- Identify satellite imagery
- Knowledge of NASA space programs used for satellite imagery
- Identify man-made construction
- Land and ocean
- Lots of Internet research
- Prepare color study guide for future years.

It's About Time

Building

Min 1 person per team

- Knowledge of time, history and physics. 50% of score. 3 ring binder allowed. 20-30 minute timed.
 - Calculation
 - History
 - Horology
 - Atomic clocks
 - Time zones
- Time making device to 0.1 second accuracy
- Must be very repeatable
- Prepare study guide for future years.
- Lots of Internet work on history and physics of various time systems
- Timer has 5 trials of varying durations
- Timer cannot be chemical or electrical
- Timer volume constraint
- Impound event
- Water or pendulum clock likely the best
- Could be divided into 1 person build the clock, 1 person prepare the study guide



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Physics Lab

Building+Lab

Min 1 person per team

- Design and assemble propeller system
- Very light weight, 2 can be fabricated
- Assembled to CD motor to measure output
- Household fan at fixed distance
- Requires CD motor and volt/amp meter to measure output. Charts of output for various designed kept and presented.
- Reference material required. Design and lab work must be used for future years.
- Some material can be used during setup.
- Impound event
- Station questions too: e.g. pros/cons of wind power. Essay.

Trajectory

Building

Min 1 person per team

- Lots of calibration
- Build trajectory, confined volume
- Build targets and obstacles
- Elastic energy source only
- Ball launcher (suggest racket ball)
- Two target areas (distance and height). Closest to target center, the better)
- Safety equipment needed (goggles)
- Requires large room with high ceiling and about 10-12m length x 2m wide
- 1 person can build another assist in competition and calibration
- See Mr. Tegen for suggestions
- Lots of charts and tables for calibration various geometries.
- Interpretation and dynamic reaction required.
- 10 minutes for both targets.

Chem Lab

Min 2 person team

- Knowledge of Chemistry
- AP focused chemistry students
- Study, study, study
- Prepare lesson book for future years
- Various topics change each year but known ahead of time
- Various laws and equations (Ideal Gas Law, Boyles Law, etc.)
- Gas, Titration, Stoichiometry, Reactions and Thermodynamics possible.
- Fair amount of home research, research, study and homework.

Environmental Chemistry (have sample rules)

Min 2 persons per team

- Soil Chemistry related to Environmental Chemistry
- Calculator required and pencils
- 1 page of hand written notes allowed. Can you write small?
- Instrumentation, chemicals, laboratory equipment provided
- OSHA safety equipment required.
- For example, give a soil sample, how much fertilizer is needed for higher yield vegetable.
- 50 minute exam

Forensics (have sample rules)

Min 2 people per team

- Solve a crime from suspects, perform tests, and evidence.
- Supplies needed to bring (e.g. containers, pH paper, magnet, hand lens, etc.)
- Allowed to bring 1 page of notes.
- Event Captain will have chemicals, fibers, etc.
- OSHA safety enforced.
- Competitors can review evidence, quantify analysis, substance testing, etc.
- DNA, chromatography, shoeprints, tire trends.



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- Must be able to create study guide for future years.
- If you like CSI, good with detailed notes, like puzzles and chemistry, this is a good fit.
- 50 minute test

Egg-O-Naut

Building

Min 2 people per team

- Launch stand required. Be able to reuse for future years.
- Launch 1L soda bottle by water and air pressure. Certain bottles work better.
- Bottle with fins
- Recovery system has protected fresh egg.
- Recovery can be parachute and cushioning.
- Time aloft scores.

Elevated Bridge (have sample rules)

Building

Min 1 person per team

- Building event
- Testing stand needs to be built as well.
- Lightest, shortest bridge with the largest load (15KG) wins.
- Exact constraints required.
- Safety requirements (goggles)
- Can be 1 person to design and build and then get assistant for competition
- Required to do software bridge design to find optimal design characteristics
- Balsa wood construction, industrial strength glue (testing to find best adhesive)
- Need access to fine cutting tools and knives and computer.
- Ask Mr. Tegen about other systems that worked and not worked well.
- Requires repetitive design, build, and test to achieve optimal design.
- Able to keep good note book of design issues for future years.
- Like working with wood and glue?

Mission Possible

Building

Min 2 people per team

- Rube Goldberg-like device to incorporate many forms of Energy transfer.
- Use of Electrical, Mechanical, Heat, Chemical, and EM.
- Lots of trips to hardware store.
- Probably confined to some volumetric space.
- Start and end energy transfer likely defined in rules so all teams start and end the same way.
- Very rule specific
- Must be versed in rules to maximize point potential.
- Timed event
- Trial and error, lots of tinkering.
- Impound likely.
- Probably time consuming build and test
- System must be repeatable and reliable
- Strong construction skills and parts required. Lego's is a non-starter.
- Multi-wall, multi-layer typical at Nationals
- Detailed engineering notebook need to keep track of design and problems for future years.
- Must be able to troubleshoot on own during competition.
- Lab notes required to be submitted
- Make good friends with your chemistry teacher for this event!
- Logical paring with Technical Problem Solving

Mouse Trap Vehicle

Building

Min 1 person per team

- Has not been done in a few years.
- Mouse trap used for energy source to drive a cart
- Cart has to be very, very light weight. Balsa wood, low friction.
- If done soon enough, could go onto another building event.
- Some gearing to cover energy into speed.



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- Guessing it is a timed event over a fixed length course (all about speed).
- Parts available at www.kelvin.com
- Cannot buy kit, but parts are OK.
- See Mr. Tegen for suggestions and advise. Especially after rules come out.
- Can be a 1 person effort with a 2nd person to help calibrate and compete.

Experimental Design (have sample rules)

2 persons required, 3 desired

- Lab preparation
- 2 minimum, 3 desired. The 2 need to be able to work very well with one another and almost read each other's thoughts.
- Some equipment required (ruler, pencils, calculator, graph paper, etc)
- Materials provided for lab analysis
- Variables, procedures, hypothesis, analysis, graphs, data tables, further analysis, conclusions, errors, assumptions, etc.
- Fair amount of practice.
- Each member responsible for different parts of the lab after initial discussion
- 50 minutes preparation
- Good handwriting and analytical analysis required
- Must be able to read instructions in detail

Picture This

2 persons required

- 4 minutes to cover 25 terms
- One person is the sketcher. No numbers, letters or symbols
- One person is the guesser.
- If you're good at 2D and 3D art this is for you.
- Can pass but cannot go back
- Love Pictionary?
- Must know the other person very, very, very well. Best buds.
- Strongly urge these be the same team as Write-It Do-It.

Technical Problem Solving

2 persons desired

- Gathering and processing of data to solve a problem
- Likely is physics based.
- Logical pairing from Mission Possible and/or Forensics.
- Very difficult.
- Knowledge of calculus and formulas important.
- Good at math and understand the physical world and want to know some senior and college level material? Get ready to crunch some formulas to arrive to an answer.
- Unclear if formulas can be brought in and this is usage of those formulas to solve a problem.
- People doing this will want to do it until their senior year so that can improve each year.
- Probably 50 minute test.

Write It-Do-It (have sample rules)

2 persons required

- Must be 2 team members
- Must be able to work really well with one another
- Should be able to read each other's minds
- One person is shown a complex object and they just describe how to build it without pictures.
- The other person takes the description/procedure and has to re-create the object.
- Team with the closest match, wins.
- Very good note taker, very detailed oriented, patient and fast
- Very good reader both of paper and of mind
- If no prior experience in coaching or taking this event, may need to work with middle school coaches to understand the tricks of the trade.
- 55 minute hands on.