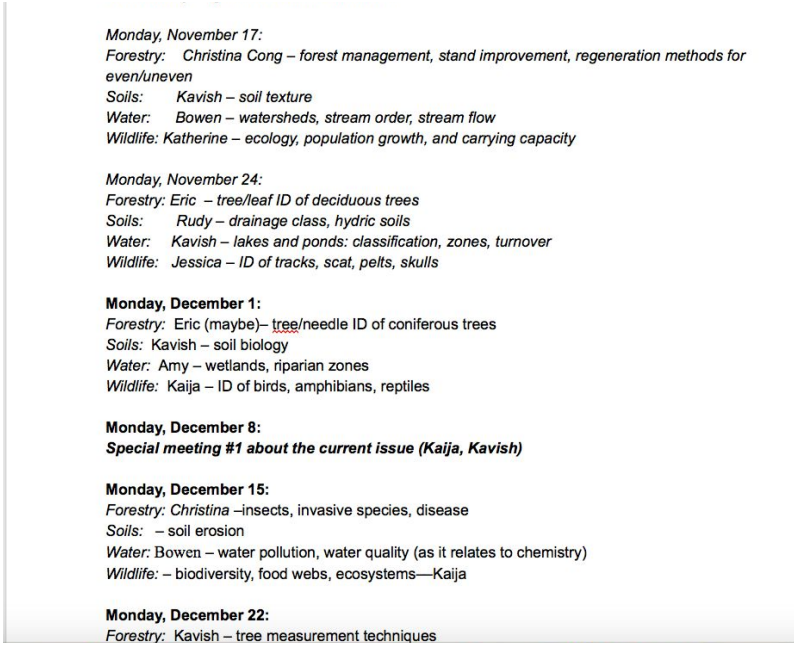
Newton North High School: The Journey to Envirothon Nationals 2015

Our journey to Nationals this year started back in September, technically, but it really all started four years with a fundamental restructuring of our team by the new captain, Malini Gandhi. The summer before the school year of 2011-2012, she brought the new team together, at the time just five or six people, and gave us a purpose: to learn more about the environment, which we had all developed a sincere passion for, and, perhaps more important at the time, *work together* to all learn as much as we could. She started our current system of weekly (or sometimes two times a week) lectures at the school from each specialist – we each were given a main specialty and a subspecialty, and were expected as well to learn the basics of every ecostation. She also established our tradition of monthly or bimonthly trips into the outdoors near the high school to help expose us to some of the nature near us as well as some of the kinds of questions we might see at the Envirothon competition in May, and she really got us started in our tradition of working hard at Envirothon and looking at the environment around us in a completely different way. That was also the first year we won the state competition, eking it out 320.09-317.26 over Lexington High School, and below is a picture of the team from that year (minus Malini, who actually had to leave the award ceremony early for a writing weekend in Vermont, but she was with us in spirit). This would be the spark that helped us continue to win the state competition the next three years and take 2nd place at the National competition in 2013.

From the left, we have our coach of all four years, AP biology teacher Anndy Dannenberg, junior Helen Maunsell, sophomore Ying Gao, sophomore Eliana Gevelber, and freshman Kavish Gandhi.

Coming into this year (as well as the two years after that restructuring), we essentially continued the tradition of working on Envirothon starting at the very beginning of the year and having weekly lectures from specialists to the entire group. However, this year, we slightly changed the format because of the changes to the competition – because now only a select few members of the team (a subteam) compete in each ecostation, we decided to split the team into the specialties and have one member of each specialty group present to the rest of the group each week on a topic of interest. This, along with the recruitment of a good five or six more members at the beginning of the year, landed us with a 16 or 17 member team split into four ecostations. This team was pared down to 10 by the end of the year but the lecturing by ecostation worked out well, and every week a lecture would be given on topics like drainage class and hydric soils, ID of Massachusetts

mammals, forest management and stand improvement, and wetlands and the importance of riparian zones. A screenshot of a portion of this schedule is shown below.



Monday, November 17:
Forestry: Christina Cong – forest management, stand improvement, regeneration methods for even/uneven
Soils: Kavish – soil texture
Water: Bowen – watersheds, stream order, stream flow
Wildlife: Katherine – ecology, population growth, and carrying capacity

Monday, November 24:
Forestry: Eric – tree/leaf ID of deciduous trees
Soils: Rudy – drainage class, hydric soils
Water: Kavish – lakes and ponds: classification, zones, turnover
Wildlife: Jessica – ID of tracks, scat, pelts, skulls

Monday, December 1:
Forestry: Eric (maybe)– tree/needle ID of coniferous trees
Soils: Kavish – soil biology
Water: Amy – wetlands, riparian zones
Wildlife: Kaija – ID of birds, amphibians, reptiles

Monday, December 8:
Special meeting #1 about the current issue (Kaija, Kavish)

Monday, December 15:
Forestry: Christina –insects, invasive species, disease
Soils: – soil erosion
Water: Bowen – water pollution, water quality (as it relates to chemistry)
Wildlife: – biodiversity, food webs, ecosystems—Kaija

Monday, December 22:
Forestry: Kavish – tree measurement techniques

Our schedule of presentations for each of the specialties

In addition to these lectures informing everyone on the majority of the important topics, we also wanted to emphasize during the presentations some of what we thought were Envirothon's most important messages: living *with* nature rather than apart from it and the importance of scientific analysis in ecosystem management. We wanted to stress, for example, that our understanding of the chemistry of soil and oxidation/reduction processes in it was not just to sate our curiosity but for the larger purpose of designating different soil areas for different land use, that our differentiation of the different forest management techniques was for the purpose of actually being able to harvest our forests sustainably so that they could *stay* healthy and we could continue to have the important paper products and wood products that sustain us in so many ways. This was also a mindset that went into our presentation this year, as it was on probably the biggest issue

facing us in this day and age, climate change. To confront this problem, we first wanted to talk to organizations around Newton that were already involved with efforts to fight climate change, and after talking to many of them via email or phone or at our local farmer's market, we decided to focus on home energy use. To do this, we in particular wanted to work with the Newton Solar Challenge, an organization that offers Newton homeowners free home solar evaluations and also aids them in finding the cheapest, most efficient solar option available as well as hooking them up with loans through a local bank. The Newton Solar Challenge focuses on solar ownership, where the homeowner reaps the rewards of any surplus electricity generated, and we found their mission to be admirable. We met with their leader, John Tourtelotte, several times, and participated in a question-and-answer session about the organization for interested Newton residents. Our major goal in the project was to help the Newton Solar Challenge reach more people in Newton, and we did this in two major ways. First, we surveyed 150 people about their knowledge of solar and their reasons for installing or not installing solar panels on their houses. We were especially surprised to realize that many people don't install solar panels simply because they don't know much about it, rather than any other pressing reason for opposition. This led us to our major project: we produced a fun informational video for release to the general public, for which we interviewed several people who had already installed solar on their houses and answered some of the more frequently brought-up questions in the survey.

In the end, after all of this work on the current issue as well as studying for the ecostations at the school, outside, and at the three workshops that various members attended throughout the year, we went to the state competition, which was as usual at a

beautiful location, this year in Quabbin Reservoir. Even despite some last minute changes to the team due to some illnesses, we managed to still do well and I really felt that our studying paid off – the topics covered on the tests really reflected what we had been studying all year, and we ended up getting 1st in soils, forestry, and wildlife as well as 3rd in water and the current issue.

Some pictures of the team from the state competition. Top right: current issue presentation. Top center: water ecostation. Top right: soils ecostation. Bottom: the entire team – from the left, senior Rudy Gelb-Bicknell, coach Anndy Dannenberg, senior Kirby Broderick, junior Amy Huang, senior Kavish Gandhi, sophomore Jessica Chen, junior Bowen He, freshman Lucy Lu, sophomore Iris Liao, and senior Kaija Gahm.

After the state competition and a brief respite for seniors to graduate and the rest to take final examinations, we quickly decided on a final team for nationals based on availability: Kavish Gandhi (the captain), Iris Liao, Bowen He, Kirby Broderick, and Christina Cong. To study for the competition, we first used the resources on the National Conservation Foundation website; listed were both resources specific to the Missouri area as well many, many resources specific to each of the ecostations. Splitting up by specialties, we worked through all of them, with all of us having the additional task of studying the current issue, urban forestry, which also had its own test at Nationals. Below are some images of just a sampling of the fish/wildlife/soils/forests we took on the task of attempting to learn how to ID, with over 40 fish, 60 amphibians/reptiles, and 50 trees among the necessary minutiae to learn.

From top to bottom: a flathead catfish, a massasauga rattlesnake, a blackjack oak, and the Menfro soil series, the state soil of Missouri.

In addition to studying the specific resources that Missouri gave us, we also met with everyone's favorite forester, Joe Perry, who also had written the forestry test for the state competition, to study tree ID and tree measurement. He was amazingly helpful, both giving us extremely useful tips for ID and teaching us some of the major tree measurement techniques that we would need to know at Nationals; and, when it came down to it, we were one of the only teams at Nationals that actually knew how to carry out the necessary measurements, all because of our training with Joe. Below are some photos of us training with Joe with the various tools, including a Biltmore stick (height and diameter), increment borer (age), clinometer (height and slope), angle wedge prism (basal area), diameter tape (diameter), and more.

Then, with all of this training complete, it was time to go to Missouri! Though a reasonably long delay in Chicago left us a couple hours late to registration, we still managed to get there in time to register, go to the trading session, and begin to meet the teams on the first night, as well as get settled in our rooms, which would be our homes for the next week or so!

The second day was training day, and it was a blast! We drove out in the blistering Missouri heat to a few beautiful sites in the Ozarks; the soils and wildlife people got to go to four wildlife and soils training stations, while the forestry and water each went to four forestry and water training stations. Each differed but in general they offered some additional advice and guidance as to how to think about and mentally prepare for the test

the next day, as well as help us get acquainted with the local wildlife, soils, trees, and water– at soils, for example, the two training stations were simply two pits in very different locations and topographies and thus with strikingly different characteristics (one had a fragipan, something we had rarely/never seen in Massachusetts, and in general the soils seemed much more well-formed and both had multiple parent materials clearly represented in the profile, enough so that we could classify certain breaks as lithologic discontinuities). After going through the training for the ecostations, each of which was led by a state expert in the subject (forester, wildlife biologist, soil scientist, etc.), each of us went to the urban forestry training stations, of which there were four in total. These helped us get acquainted with the various management techniques for the urban forest, methods to conduct a urban tree inventory, proper ways in which to prune and take care of a tree, and effective ways to make sure trees remain safe and healthy during construction – in general providing us copious notes both to review frantically the night before the competition and to use when sequestration time came around on Friday, at which we were allowed our notebooks for training day.

After training, a grueling 8-9 hour affair, we came home on buses to have a quick bite to eat, relax for a little while in our rooms (or study), and then finally attend a mandatory study session at night, at which we reviewed and shared our notes from the day. Then it was off to sleep, for it was testing day the next day!

Testing day started off early, as usual, with breakfast from 6:30 – 8:00 and transportation leaving shortly afterwards. The order of our ecostations was water, soils, wildlife, urban forestry, forestry, and I can say that everything went very smoothly; despite the fact that the test did not cover as many of the resources as we might have liked, our

teamwork went well and, outside of a few mishaps, all of the questions were answered to a high degree of confidence. The only aspect of the tests that surprised us was the fact that all five ecostations were included as a component of every test, instead of the tests being focused solely on the ecostation at hand – this did, we felt, limit the depth of each of the tests but also did require us to take an integrated approach and also work together as a team to complete all of the tests. To provide a little more detail (although the Nationals tests change every year), I will list some of the more hands-on aspects of the stations – note that much of each ecostation was writing-based with management questions, so this is only a sampling of each of the tests.

(1) **Water:** the water station took place right next to a stream, and required us to, for example, identify macroinvertebrates, test for turbidity using a Secchi disk, and measure a nearby tree for attributes relating to stormwater management.

(2) **Soil:** as usual, the soil ecostation had us look at two pits and assess many characteristics about them. In addition to this, it also had us ID a few nearby trees and assess their suitability to the soil at hand (using a web soil survey packet).

(3) **Wildlife:** the wildlife station had us ID skulls and tracks as well as certain trees near a construction site, which we were then supposed to assess as to which one was best to retain in terms of the benefits it provided.

(4) **Forestry:** as would be expected, we were expected to identify numerous trees here, as well as measure the characteristics of numerous trees and the basal area of the entire stand. We also had to determine the affected tree species for five separate pests/diseases with images at one particular table.

(5) **Urban forestry:** Here, among other things, we had to identify the wildlife that caused the damage to two trunks that they had placed on a table, as well as identify for which of three trees had proper pruning techniques been followed.

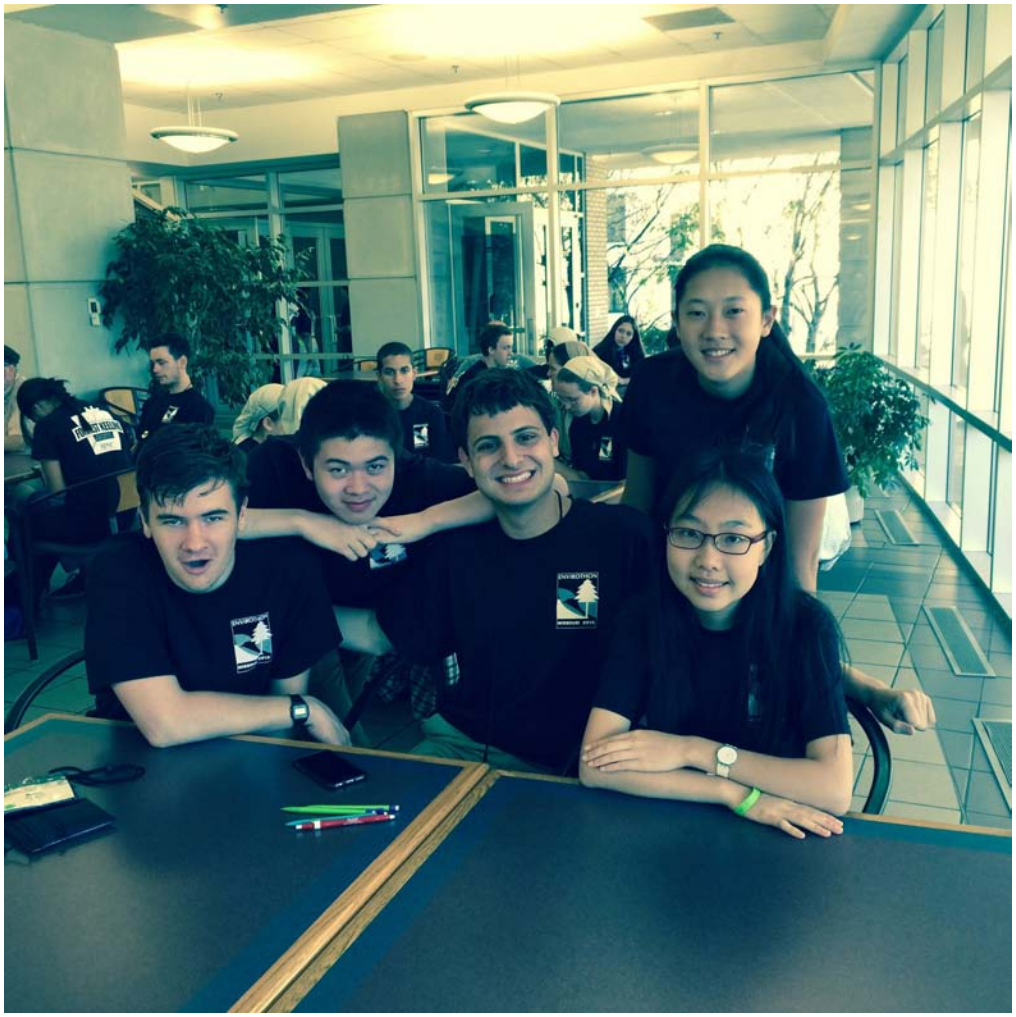
As mentioned before, this is only a sampling of what was on the tests, but in general we hope this gives you a flavor of what the tests were like! After the tests were over, we were completely spent, and the rest of the night was spent relaxing at a mandatory dance – playing cards, eating, drinking lots of water (it had been another hot day), and finally sleeping.

The fourth day was a fun day at Silver Dollar City, a local amusement park in Missouri. After taking a group picture, we were left to our own devices, and we essentially made the most of it: going on roller coasters and water rides, eating, playing cards, and in general restoring our energy for the next two days of presentation. At this point, we had no idea how we had done on the tests, so this day was spent mostly getting to know other teams and in general having fun – which we did!

The two final days were for the presentations, and they were an experience. The first day was spent in a sequestration room for seven hours putting together a presentation – this year, the presentation was on the Springfield School District, and we were tasked with developing a plan to manage the urban forest of the district given a tree inventory and a set staff. Our idea was to develop a very detailed plan to cover all the bases, from an inventory to maintenance schedule to emergency plan to specific ways in which we would be managing our wildlife, soils, water, and tree resources – we focused more on this fact than the particular presentation style for the first six or so hours, and then devoted the last hour or so to putting together visual aids, memorizing our scripts, and in general putting

the finishing touches on the presentation. After finishing, we (along with all of the other teams) received a resounding congratulations from the coaches upon returning to the dorms, spent the night practicing a little but mostly relaxing in the mandatory recreation night at which we and the New York advisor put together a jigsaw puzzle without the frame (for an extra challenge!). Going to sleep that night, we felt very confident with the presentation.

The next morning, we woke up and went over to the presentation space; we had to wait a while before presenting because they staggered it into groups of 11 teams. Below is a picture of us while we are waiting sporting our black North-American Envirothon t-shirts.



And, in the end, the presentation went well; we got through it in exactly 19 minutes and 59 seconds and seemed to answer all of the questions well. When the announcement of scores came around, we were very pleasantly surprised (and excited!) to be announced in the top 4 overall, which meant that we would redo our presentations in front of a new panel of judges. This new current issue score would be combined with our ecostation scores to determine the overall top 4. Having already done the presentation once, we were confident the second time around, if a little nervous of presenting in front of all of the Envirothon teams, but in the end it went well again! We spent the rest of the day just watching the rest of the top four present and finally attending the banquet at night, at which the scores were announced and we found out, to our excitement, that we had scored 4th place overall, along with a tie for first in forestry! It was truly a great feeling to have achieved this especially with a very new team with only one veteran from Nationals the previous two times, and we were very proud of our performance and how much we had learned over the course of the year, especially during the last couple months.

We also got the chance, over the course of the days, to get to know some of the teams; we especially got close to the North Dakota team, with whom we had some interesting and fun discussions, the California team, with whom we ate meals a few times, and the New York team, to whom we'd gotten 2nd place just two years ago. Each of us also had a number of discussions with people from any number of states, and in this way Envirothon was definitely not just an experience of the competition but also an experience in which we got to experience a lot of different points of view and meet many fascinating people from all different states and provinces. This, to us, represents what Envirothon is all about: promoting the ideals of conservation in the form of all of the ecostations and the

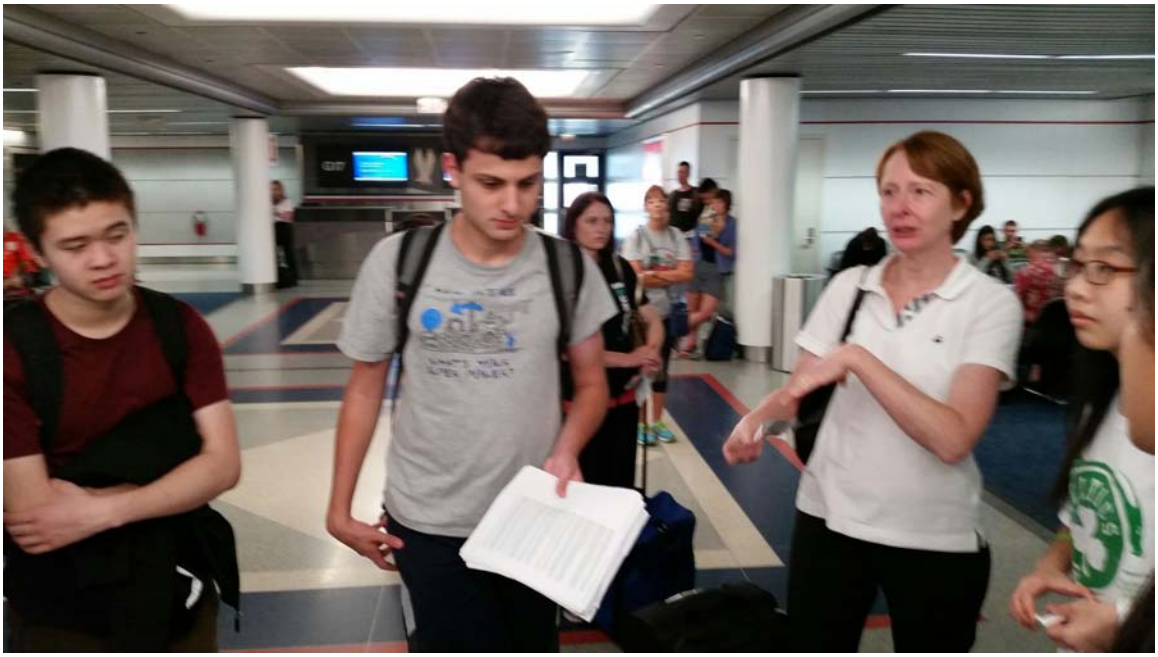
current issue, but also promoting the ethos of collaboration and working together towards a common goal that we all believe in, for it is only in this way that anything will truly change. To conclude, we would like to thank the Massachusetts Envirothon and National Grid for supporting us in this endeavor: we truly had an incredible trap and have learned so, so much, and everyone, especially our seniors, has been transformed by the experience of being a part of Envirothon.

Thanks so much again!

- The Newton North Envirothon Nationals team, consisting of Kirby Broderick, Christina Cong, Kavish Gandhi (captain), Bowen He, Iris Liao

Below are some further photos from the competition.

At the airport coming to the competition:




SCIENCE
WHAT'S YOUR
SUPER POWER?

Going to Silver Dollar City:

Playing cards before the presentation:

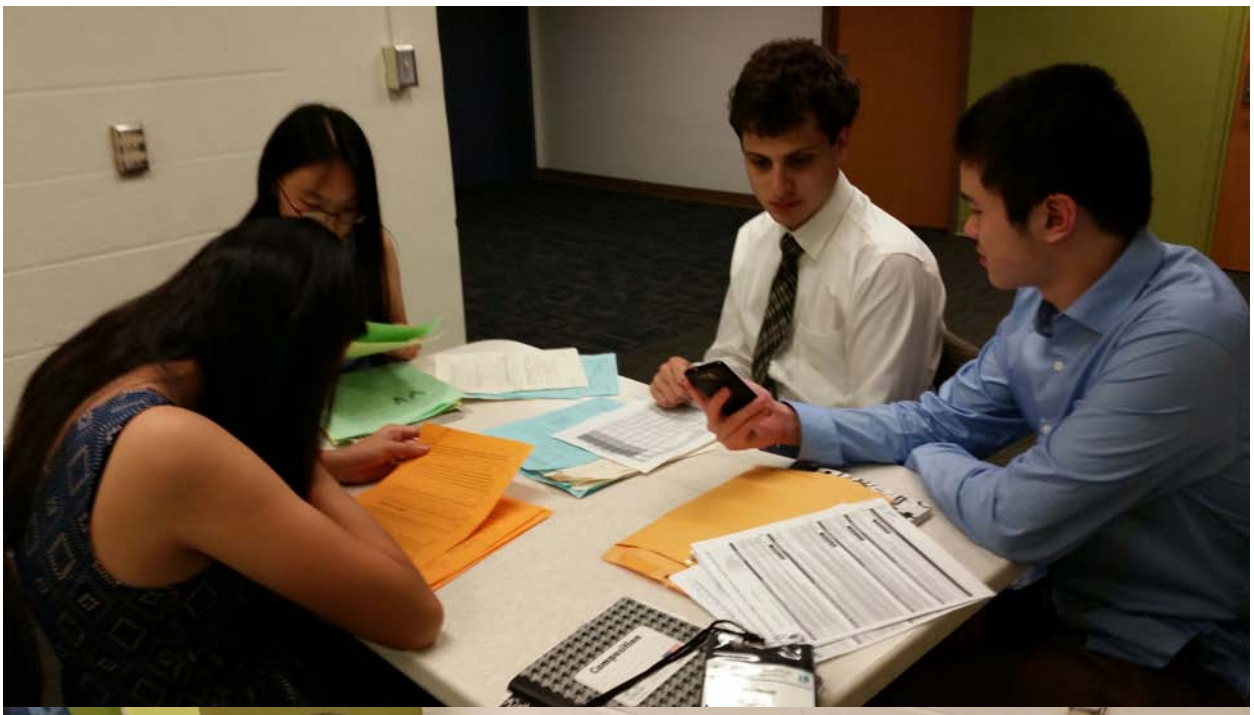
Before the banquet:

At the banquet:


Massachusetts


Massachusetts

Reviewing the tests after the banquet:



At the airport coming home – doing science trivia!: