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## ***Urban Barcode Project Guidelines***

### **Rules of Participation**

These are the rules for participating in the *Urban Barcode Project (UBP)*. All participants are required to read and comply with these rules. Any team whose participants violate these rules will be ineligible to continue in the project. The DNA Learning Center reserves the right to interpret and amend these rules at any time.

### **Eligibility Requirements**

#### ***Team Guidelines***

1. All entries must be made by a **student team** and a **UBP qualified science teacher** or **mentor**.
2. All **student** team members must be enrolled in grades 9–12 at a high school, public or private, in the New York City metropolitan area. Students must enroll as a team of 2–4 students.
3. Students on a team **do not** need to be from the same school.
4. Each student can only be a member of one team.
5. **UBP-trained science teachers** must be science teachers who are currently employed as full- or part-time faculty at any public or private high school in the New York metropolitan area to sponsor a team.
6. **Science teachers** must have completed the *UBP* DNA barcoding workshop.
7. **UBP-trained mentors** must have a working knowledge of DNA barcoding and must be current employees or graduate students at any university or research institution in the New York City metropolitan area.
8. **UBP-trained science teachers** and **mentors** agree to ensure students they sponsor are properly supervised for all project-related activities. If required by their school, teachers must submit parent release forms for each of their students participating in the *UBP*.
9. **UBP-trained science teachers** and **mentors** are responsible for enforcing all safety regulations required by the *UBP* as well as any and all rules and regulations required by their local schools and the NYC Department of Education.

10. **UBP-trained science teachers** will usually sponsor students from their own schools. At their discretion, they may sponsor teams composed of students from their own and/or other schools. **Mentors** may sponsor teams composed of students from different schools.

### ***Entry Requirements: Project Proposal***

Students are required to submit a proposal (maximum 5 pages) for an investigation that satisfies the following requirements:

1. Investigations must make use of DNA barcoding.
2. Investigations may not make use of the collection of any samples derived from humans.
3. Investigations may not involve the collection of samples that are of known risk to human health including blood or other bodily fluids, clinical samples, animal droppings, etc.
4. Reagents and materials for DNA isolation, and sequencing for a **maximum of thirty samples, sequenced in both the forward and reverse directions**, will be provided to each team.
5. All projects must specify in detail what samples will be collected, including: type of samples, estimated number of samples, how these samples will be collected, where these samples will be collected, and what efforts, if any, are needed to avoid damage during the collection process.
6. No team may employ methods to collect samples that put team members or other people at risk of being harmed.
7. The project may not involve harming or destroying any animal life (with the exception of collecting selected invertebrates not classified as threatened or endangered).
8. The project may not involve the destruction or significant damage of plants that are public or private property, or the collection of entire plant specimens from parks or gardens. No threatened or endangered plants may be collected. In most cases, collected plant samples should not exceed a single leaf or needle.
9. It is the responsibility of each *UBP* team to determine if the location of sample collection requires authorization and to obtain the appropriate permission. Any required documentation must be maintained by the *UBP* teacher or mentor.
10. Any samples collected from commercial vendors (stores, markets, etc.) must be anonymized. The names, locations, and any other identifying information about where samples (e.g. meat, fish, other foods) were purchased may only be recorded in the team's private notes, and not released without written authorization from the vendor.
11. No team may violate any laws or statutes as part of their participation in the *UBP*.
12. Participants agree to assume any and all responsibility for all their actions connected with participation in the *Urban Barcode Project*. Participants agree to assume full liability for any damages, injuries, or liabilities connected with their participation in the *UBP*.

## Research Proposal Requirements

Submitted *Urban Barcode Project* proposals will be reviewed for evidence of research ability, scientific originality, and creative thinking. The proposal is your time to show skillful planning of an interesting project. Projects must use DNA barcoding as an essential part of the experiments. Projects where DNA barcoding is used to answer questions that could not be answered in other ways will be given preference. Reagents, materials, and sequencing for a maximum of thirty samples sequenced in both directions will be provided to each team.

### **Format of the Proposal**

1. The proposal should be a maximum of five pages (excluding references) that incorporate the following components:
  - **Introduction**, surveying current literature, background and purpose of the project. (maximum one page)
  - **Specific Aims**, providing the goals and approach of the experiment. (maximum one page)
  - **Methods section**, detailing how samples will be collected, archived, and processed to produce barcodes. If the project requires taxonomic identification independent of DNA barcoding, a clear plan must be included. Any anticipated permission needed to collect samples must also be documented. (maximum two pages)
  - **Data Interpretation Plan**, detailing methods for data analysis, including any planned graphical or statistical approaches. (maximum one page)
  - **Reference section**, outlining all sources used with internal citations. The reference section is not included in the five pages. Participants are encouraged to seek all forms of resources, such as journals, text books, and mentors in the field. (no page limit set)
2. Proposal margin and spacing requirements: the proposal must be clear, legible, and conform to the following requirements:
  - Use one of the following typefaces: Arial or Times New Roman, 11 point
  - Margins, in all directions, must be 1 inch
  - Single spaced
3. Work submitted by students is expected to be of their own original design and execution, and presented in their own words. Full disclosure of any other person or resource that may have influenced the applicants' proposal is required. In addition, the research project should reflect the work of the students only. Students may receive review of their work and writing but all alterations are to be that of the students.

### **Team Information**

1. Each student must include a brief biography including their name, present grade (9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup> or 12<sup>th</sup> grade), and the name of their school/institution (including state and zip code). Sponsoring teachers or mentors are strongly encouraged to must be submitted a brief biography as well.
2. If required by the school, signed permission forms from parents for all minors doing research must be included with the proposal.
3. A signed teacher or mentor statement certifying that the proposal was written by the student team members and developed from their ideas must accompany each proposal.

## Proposal Rubric

The proposals will be reviewed using the following rubric. Each section will be scored out of a maximum number of points as indicated in the attribute points column. Reviewers will use the guidelines in the table below when determining how many points to award for each section. The total points from all reviewers will be calculated and the proposals ranked based upon this aggregate value. Proposals that are incomplete or do not conform to the proposal guidelines may be rejected at the discretion of the reviewers and project staff.

Attributes	Above Standard	At Standard	Below Standard	Attribute Points Earned
	<b>(10-9)</b>	<b>(8.5-7)</b>	<b>(7-0)</b>	
<b>Introduction</b>	Identified an interesting and testable question that relies on DNA Barcoding.	Identified an interesting and testable question that can be answered with DNA barcoding, but does not need barcoding.	The purpose is incomplete, too easy to attain, or does not rely on DNA Barcoding.	<b>/10</b>
	<b>(5-4.5)</b>	<b>(4-3.5)</b>	<b>(3-0)</b>	
<b>Hypothesis</b>	Utilized Literature Search to develop a hypothesis which was reasonable and well substantiated.	Utilized Literature Search to develop a hypothesis which was reasonable.	Hypothesis is not complete or does not flow logically from research.	<b>/5</b>
	<b>(10-9)</b>	<b>(8.5-7)</b>	<b>(7-0)</b>	
<b>Methods</b>	A well thought out, sequential (step-by-step) procedure is stated that ANYONE could look at and follow. It holds high promise for collecting the information sought. Measurements to be made are systematic and logically controlled (changing one variable at a time) and are repeated to improve reliability of data.	A complete, sequential (step-by-step) procedure is stated but is difficult to follow. It holds promise for collecting the information sought. The measurements to be made are systematic and logically controlled (changing one variable at a time).	The procedure is incomplete, not sequential, or takes effort on the part of the reader to follow. It may not be systematic or logically controlled (perhaps your group has defined many variables to vary at once and have not clearly decided how to measure all variables.)	<b>/10</b>
	<b>(5-4.5)</b>	<b>(4-3.5)</b>	<b>(3-0)</b>	
<b>Data Interpretation Plan</b>	Plans for displaying the collected data are clearly laid out (a table is STRONGLY recommended). Thoughts for ambitious analysis of data (graphical analysis, etc.) are clearly communicated.	Plans for displaying the collected data are clearly laid out (a table is STRONGLY recommended). Thoughts for thorough analysis of data (graphical analysis, etc.) are clearly communicated.	The plan is incomplete or does not logically match with the data your group has decided to collect.	<b>/5</b>
	<b>(5-4.5)</b>	<b>(4-3.5)</b>	<b>(3-0)</b>	
<b>Reference Section</b>	A complete and properly formatted reference list is included. References to the literature are always marked in the body of the proposal.	A partial or slightly and improperly formatted reference list is included. References to the literature are usually marked in the body of the proposal.	The reference list is incomplete, difficult to use due to errors, or not marked correctly in the body of the proposal.	