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| Class | Learning Goals | Topics | Activities | Materials | Assignments | Hours |
| 1: Discovering Our Environment | * discover how resources are used differently by various people. | * intro to course * where students live * how we use coastal ecosystems | * discuss course, review syllabus * students use pushpins to indicate places of importance to them on map * teacher points out and discusses places where field trip will take place | * computer plus projector * course syllabus * large map of local area (where students live) and where field trips will take place * pushpins | * In preparation for assignments 2, 3, & 4, list the common and scientific names of three plants and three animals that live in *each* of the following ecosystems: sandy beach, rocky shore, salt marsh. | * 1.5 |
| 2: Beaches | * SWBAT describe the formation, ecological conditions, and human impacts on beach ecosystems | * beach formation * adaptations of plants and animals | * day at beach discussion * powerpoint of beach ecology * brainstorm about adaptations of plants and animals | * computer plus projector * optional: sand from various locations * images of beach organisms | * Investigate one plant and one animal that lives exclusively on local sandy beaches. Create a one page species profile for each (format provided) using four or more sources | * 45 min- 1 hr |
| 3: Rocky Shores | * SWBAT describe the formation, ecological conditions, and human impacts on rocky shore ecosystems | * rocky shore formation * adaptations of plants and animals | * powerpoint of rocky shore ecology * brainstorm about adaptations of plants and animals | * computer plus projector * optional: barnacle encrusted rocks * images of rocky shore organisms | * Investigate one plant and one animal that lives exclusively on local rocky shores. Create a one page species profile for each (format provided) using four or more sources | * 45 min- 1 hr |
| 4: Salt Marshes | * SWBAT describe the formation, ecological conditions, and human impacts on salt marsh ecosystems | * salt marsh formation * adaptations of plants and animals * brief description of freshwater wetlands | * powerpoint of salt marsh ecology * brainstorm about adaptations of plants and animals * extra time should be used to give students time to finish/edit assignments 2-4. | * computer plus projector * optional: mud, mussel, or grass from marsh. * images of salt marsh organisms | * Investigate one plant and one animal that lives exclusively in salt marshes. Create a one page species profile for each (format provided) using four or more sources | * 45 min- 1 hr |
| 5: Adaptations to coastal ecosystems | * SWBAT compare and contrast the appearances and adaptations of organisms to the three different ecosystems | * species found in various ecosystem | * Students display and view species profiles, fill in activity sheet. * Quiz on ecosystems. | * Activity sheets * Quizzes * Literature Review Guidelines | * Following guidelines, create an outline for a literature review on the human impacts and historical uses of the ecosystem of your choice (salt marsh, rocky shore, sandy beach) | * 45 min- 1 hr |
| 6a: Project 1- Literature Review | * SWBAT locate peer-reviewed journal articles. * SWBAT import article info into citation management software | * how to find journal articles * how to cite articles * how to write a literature review | * Students find articles on ecosystem of choice * Students import info into citation management software | * Computers for every student. * EndNote or RefWorks downloaded onto each computer | * Compose literature review. * Exchange drafts with partner and edit accordingly. | * 1.5 hrs |
| 6b: Literature Review Criticism | * SWBAT use a rubric to give clear feedback * SWBAT use feedback to edit literature review | * purpose of peer review * do's and don’t's to effectively give and receive criticism | * Students exchange literature reviews and give critical feedback * Students edit papers accordingly | * Rubrics * Peer review instructions * examples of effective and ineffective critiques | * Complete project 1 * Bring camera for field trip next week | * 1.5 hrs |
| 7: Field Trip 1- Exploring Our Coast | * SWBAT use tools such as journals and cameras to record observations * Students observe similarities and differences in flora, fauna, and abiotic factors of two different environments. | * nature journaling * nature photography | * Students visit local beach, salt marsh, or rocky shore. * Students record observation data into notebook | * Guidelines for nature journaling * Buckets * Nets * Clipboards and pencils * Binoculars * Field guides | * Visit one other coastal ecosystem and complete nature journal and take photos * Upload observations and pictures from both sites. * Write a descriptive essay comparing and contrasting sites | * 2 hrs |
| 8: Water Quality Testing (classroom) | * SWBAT use water quality testing equipment * SWBAT discuss why different bodies of water support different life forms | * Water quality parameters and effects on organisms * Water quality testing techniques | * Demo using equipment * Students test parameters of four water samples. * They then make predictions of where the samples were taken and what might live there | * Hydrometer, water test kit, water samples * "How to write a lab report" handout | * Type and submit lab report | * 1.5- 2hrs |
| 9: Field Trip 2- Water Quality Testing (field) | * Students will practice collecting data in field | * Water quality testing * Data collection, compilation, and analysis | * Split into groups, students go to different locations to test water independently * In classroom, compare data collected, discuss problems. | * Water testing equipment | * Select a partner and brainstorm three ideas for research project: Ask * *what is the effect of x on y?* or * *does x cause differences in y at various locations?* * Email or upload project ideas. * Comment on three classmates' project ideas | * 2 hrs |
| 10: Sampling Methods (classroom) | * SWBAT describe point counts, CMR, transects, and quadrat sampling | * Population data collection methods | * Using models, students try each of the four sampling techniques | * Modeling equipment | * Select project idea. * Determine which sampling method will work best for your question. * List the materials and detailed methods for your project * Upload, then critique 3 classmates' materials/methods | * 1.5-2hrs |
| 11: Field Trip 3- Sampling Methods | * Students will practice collecting data in the field | * Population sampling * Data collection, compilation, and analysis | * Split into groups, students go to different locations sample independently * In classroom, compare data collected, discuss problems. | * quadrats, etc... * Outline for research proposal | * With partner, draft research proposal following format provided * Upload, then critique 3 classmates' proposals | * 1.5- 2 hrs |
| 12: Preparing a Proposal | * SWBAT prepare a proposal following NSF format | * Purposes of proposals * Common mistakes | * After discussion, students edit proposals. | * computers for each student | * Data collection: record data. Write two paragraphs describing difficulties encountered. | * 1.5-2 hrs |
| 13: Peer Review | * Students learn to offer and receive constructive criticism. | * Reviewing proposals and difficulties with data collection | * Students present proposals to class and preliminary data collection difficulties | * NA | * Data collection * Refine proposal to meet classmates' criticism. * Email to teacher | * 1.5- 2 hrs |
| 14: Data analysis | * SWBAT use Excel to conduct simple data analysis and generate graphics | * Data analysis | * Instructor will guide students in choice of statistical tests * Students will produce graphics of data for project | * computers for each student | * Discuss results and conclusions, send to instructor. | * 1.5-2 hrs |
| 15: Presentation composition | * SWBAT create visually appealing, informative scientific posters | * Poster composition | * Discussion of poster tips and guidelines, samples of 'good' and 'bad' posters * Students create posters | * computers for each student | * Final revision of paper, incorporating instructor's comments * Finish poster, email for printing three or more days before class | * 1.5-2 hrs |
| 16: Science Fair | * SWBAT to discuss there projects for a wide audience | * Poster presentation | * Students will present posters to school community | * Pushpins/ tape, printed posters, and space for posters |  |  |