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| **PBL Design Form** |
| **Name of Project:** Digging for Dinos | **Duration:** 3 Weeks |
| **Facilitator(s):**  Abby Schorr | **Subject/Course:**  Science **Other**: Math, Technology, Language Arts | **Grade Level:** Grade 2 |
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| **Accountability** | **Key Knowledge & Understanding**Content & Literacy Standards to be taught and assessed  | **NYS CCLS/Framework:** [**Science**](http://www.p12.nysed.gov/ciai/mst/sci/documents/p-12-science-learning-standards.pdf)[**Math**](https://www.engageny.org/resource/new-york-state-p-12-common-core-learning-standards-for-mathematics)[**ELA & Literacy**](https://www.engageny.org/resource/new-york-state-p-12-common-core-learning-standards-for-english-language-arts-and-literacy) | **[Final Products/](http://www.ocmboces.org/teacherpage.cfm?teacher=3097)****[Performances](http://www.ocmboces.org/teacherpage.cfm?teacher=3097)** |
| **Individual** | **Next Generation Science Standards:** * 2--‐ESS1--‐1: Use information from several sources to provide evidence that Earth events can occur quickly or slowly

**Literacy Standards:*** RI 2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
* W 2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.
 | **Opinion Paragraph** Students will use critical thinking and evidence to support their opinion or answer to the DQ: How can we, as paleontologists, explain what happened to the dinosaurs?[Rubric](https://www.lake.k12.fl.us/cms/lib05/FL01000799/Centricity/domain/17/elementary%20ela%20blueprints%202015-2016/2nd%20gr.%202015-16/Opinion%20Rubric%202nd%20grade.pdf) |
| **Team** | **Next Generation Science Standards:** * 2--‐ESS1--‐1: Use information from several sources to provide evidence that Earth events can occur quickly or slowly

**Math:** * 2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
* 2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.
* 2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
* 2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

**Literacy Standards:*** W 2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
* W 2.8 Recall information from experiences or gather information from provided sources to answer a question

* [SL.2.4](http://www.corestandards.org/ELA-Literacy/SL/2/4/) Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
 | **Museum Display**Students will be working in teams to create a fossil representation of their dinosaur and its habitat. They will present their research information and answer to the DQ.[Rubric](http://www.readwritethink.org/files/resources/lesson_images/lesson892/Rubric.pdf) |
| [**Success Skills**](http://www.bie.org/blog/how_to_use_the_4cs_rubrics) | **Collaboration** [K-2](http://www.bie.org/object/document/k_2_teamwork_rubric)  | Scaffolded Collaboration Assessment—certain parts, more added over time (begin with self, then teacher, then peers. | **Critical Thinking/****Problem Solving** [K-2](http://www.bie.org/object/document/k_2_critical_thinking_rubric)  | Same strategy |
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| **PBL Design Form** |
| **Project Summary** | Scientists are still not 100% certain about the event that caused the extinction of dinosaurs. Students will assume the role of paleontologists and use a variety of research methods to learn about the different types of dinosaurs and the habitats where they once lived. Students will be doing additional research about dinosaur extinction in order to make a claim as to what happened to the dinosaurs. Students will also be creating a museum to display and share their research with others. |
| **Challenging Problem or** **Driving Question** | How can we, as paleontologists, explain what happened to the dinosaurs? |
| **Initiating Inquiry: Entry Event**  | (How will you initiate inquiry? Describe your plan to kick off the project and engage students. Be sure the Entry Event will encourage students to ask questions related to the Driving Question.)While working out in the garden, students will “discover” fossils that the teachers have planted there. Upon this discovery, students will brainstorm a list of possibilities of the type of animal based on the fossils they find. (To see a video of this entry event, visit https://youtu.be/dI0F3kYsJP4.) |
| **Initiating Inquiry: Anticipated Student Need to Knows** | **Need to Knows**(List questions that the students may ask related to the project.)* What are some types of dinosaurs?
* What is a fossil?
* What does extinction mean?
* What is a habitat?
* How many years ago did dinosaurs live on Earth?
 | **Effective Questioning Prompts** (If students don’t ask the right questions, how will you guide them?)Use scaffolded Question Formulation Technique* Use sentence stems
* Ask questions to get students to ask questions:
	+ Do dinosaurs live on Earth today? Have you ever seen one?
	+ Why haven’t we seen one?
	+ How do we know dinosaurs existed?
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| **Methods of Inquiry** | **Interview a Paleontologist**: students will generate as a class interview questions to ask Kaitlin Maguire, Graduate Student at Berkley. Each student will have the opportunity to ask one question each | X | **Field Trip**: [Mammoth Discovery @ Children’s Discovery Museum of San Jose](https://www.cdm.org/visit/exhibits/mammoth-discovery/) | X | **Video Analysis**: [National Geographic Series](http://video.nationalgeographic.com/search?subject=animals/prehistoric-animals/dinosaurs/) | X |
| **Research**: Information will be provided | X | **Examination & Observation** while at the Mammoth Discovery Museum using Scientific Journal | X |
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| **PBL Design Form** |
| **Making Products Public** | Students will display their museum exhibit and present their learning to parents, Kindergarten, and First grade students—the audience will complete a 3-2-1 summarizer for each presentation: 3 things I learned, 2 areas for improvement with presentation and exhibit, and one question I still have. These presentations will be recorded and sent to the Paleontologist at Berkeley for feedback about accuracy of predictions for extinction and the dinosaur and its habitat. |
| **Resources Needed** | **On-site people, facilities**: Kindergarten & First Grade Students and Teachers, Garden for the entry event, STEM teacher to support inquiry during STEM pullout |
| **Technology & Digital Resources**: National Geographic Dinosaur Documentaries-- iPads |
| **Materials**: Books, Articles, fossils (created by teachers), clay mixture for student fossils, and other items as needed for display |
| **Community Resources**: Kaitlin Maguire, Graduate Student at Berkley |
| [**Voice & Choice Options**](http://www.ocmboces.org/teacherpage.cfm?teacher=3097) | **Topic**: Teams will choose from a list of dinosaurs to study. | X | **Time**: Students can choose times when to conference with teacher about progress and next steps | X |
| **Task(s):** Teams will have choice in the design of their exhibit. | X | **Team**: Teams will be created by teacher; students can choose from rotating roles | X |
| Other: |  |
| **Reflection Methods** | **Scientific Journal**: Students keep a Scientific journal. Teachers may prompt students each day with a question to answer. | X | **Fishbowl Discussion**: Discussion will be used throughout to share information and process learning. | X |
| **Chat Stations**: Students will share and reflect on their research using [Chat Stations](https://www.youtube.com/watch?v=eFUL4yP0vqo) | X |
| **Team-Led Conference**: Weekly conferences with teams to discuss progress and collaboration | X | **Other**: Self- and Peer-Assessments |  |
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| **Managing the Project** | **Learning Objectives/Targets** | **Checkpoints/Formative Assessments** | **Instructional Strategies** **for All Learners** |
| Phase 1: Launch Project* Entry Event
* Driving Question
* Need to Know
* Public Product Rubric
* Form Establish Teams
* Success Skill Rubric
 | *Ex. I can make detailed agreements with how my team will work together.* |  *Student created team contract.* | *Fishbowl discussion to generate ideas around contract components and how to work with one another.* |
| I can describe our public product.I can ask Need to Know Questions.I can recall the Driving Question when asked.I can retell how we will be assessed using rubrics.I can follow our class norms of collaboration.I can share ideas with my team. | Quality of Need to Know QuestionsTeam ConferencesJournal Entry in Scientific Journal | **Entry Event/DQ**:* Dig up bones in garden—make predictions
* Form teams, reveal DQ, and discuss team product using rubric
* Show [video](https://www.cdm.org/mammothdiscovery/questvideo.html) from Museum of how paleontologists used fossils to bring Lupe, the wholly mammoth to life
* Take a virtual tour of the museum
* Show different types of dinosaurs and have student teams choose the dinosaur they would like to study
* Students use picture to generate questions

**Need to Know**:* Use QFT method in generating Need to Know Questions (Students jot down questions in Scientific Journal individually before sharing with team and then whole class)

**Collaboration**:* Create an anchor chart with students outlining norms for collaboration (use rubric as a source)
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| **Managing the Project** | **Learning Objectives/Targets** | **Checkpoints/Formative Assessments** | **Instructional Strategies** **for All Learners** |
| Phase 2: Build Knowledge * Align learning goals to individual and team products
* Determine formative assessments to support student learning
* Identify checkpoints to assess student learning and progress with final products
* Establish instructional practices
 | *Ex. I can use evidence to support my claim.* | *Graphic Organizer (Claim with Evidence)* | *Charrette Protocol Using Graphic Organizer* |
| **Team Product: Museum Exhibit****Science****NGSS 2--‐ESS1--‐1:** I can use information from several sources to provide evidence that natural events can occur quickly or slowly. **Literacy****W.2.8** I can share research details with my team.**Math****2.MD.1** I can measure the length of an object using a ruler, a yard stick, and a measuring tape. **2.MD.3** I can estimate lengths using units of inches and feet. **2.MD.4** I can measure to determine how much longer one object is than another. I can express the length difference in terms of inches and feet.**2/MD.5** I can write a word problem comparing the heights of two dinosaurs.**Success Skill**I can listen to the ideas of my teammates.I can treat my teammates with respect.I can do my work for the team on time. | **Science*** Exit tickets after lessons
* Scientific Journal entries
* Extinction theory quizzes

**Literacy*** Answers to Chat Station questions
* Collect Scientific Journal entries with research information

**Math** * Measurement quizzes
* Exit tickets

**Success Skills*** Peer evaluations
* Self-evaluations
* Teacher observations
 | **Science*** During the field trip, students will take pictures of exhibits and record data in their Scientific journals
* Students will also interview paleontologist and record answers to their questions
* Teacher introduces five different types of dinosaurs using a Process Grid (GLAD Strategy).
* Teacher introduces the four theories of dinosaur extinction (asteroid, volcano, mammal competition, continental drift)

**Literacy*** Set up Chat Stations to share research

**Math*** Use Math Investigations Unit 9, Measuring Length and Time, to align math curriculum with project
* Measurement lessons and activities using standard and non-standard units of measure
* Collaborative tasks around measurement
* Model strategies to solve word problems
* Students trade and solve each other’s word problems.
* Critique and give feedback.
* Model how to write a word problem
* Solve word problems collaboratively

**Success Skills*** Determine and model expectations for group work
* Use and model rubrics for group work
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| **Individual Product: Opinion Paper****Science****NGSS 2--‐ESS1--‐1:** I can use information from several sources to provide evidence that natural events can occur quickly or slowly. **Literacy****W.2.1** I can write a paragraph with a topic sentence, three supporting facts, and a conclusion. I can use linking words to connect opinion to reasons.**W.2.1** I can identify a claim and support it with sufficient evidence. I can analyze a topic using valid reasoning.**Success Skill**I can think critically about the extinction of dinosaurs using evidence. | **Science**Collect Scientific Journal**Literacy*** Informal writing assessments
* Writing prompts “on--‐demand”
* Observe color coding
* Sentence structure quizzes

**Success Skill*** Self-assessment
* Collect draft and provide feedback
 | **Science**Students will use their Scientific Journal to record their research, which includes information from field trip, interview, videos, and readings**Literacy*** Students read a paragraph and identify the claim and supporting evidence by underlining in different colors
* Focused writing lessons about making a claim and supporting it with evidence
* Whole class claim paragraph about one theory to model structure
* “Claim Activity” – see Project Calendar
* Anchor chart with evidence based claims: For example, according to…, Based on …
* Students orally make their claim and support with evidence while peers give them feedback. Is your claim valid? Does your evidence support your claim? (Charrette Protocol)
* Students must use their Scientific Journal as a resource for writing the opinion paragraph
* Focused lessons around complete sentences, punctuation, and capitalization.
* Fiction/nonfiction stories to build context

**Success Skill*** Students will engage in a pre-writing Charrette Protocol
* Students will use teacher and peer feedback to revise
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| **Managing the Project** | **Learning Objectives/Targets** | **Checkpoints/Formative Assessments** | **Instructional Strategies** **for All Learners** |
| Phase 3: Develop & Critique Products* Help students apply learning
* Utilize feedback protocols
* Provide opportunities for revision
 | *Ex. I can give useful feedback to my peers.* | *Reflection on Feedback & Revisions Made* | *Critical Friends Protocol* |
| **Science****NGSS 2--‐ESS1--‐1:** I can use information from several sources to provide evidence that natural events can occur quickly or slowly. **Literacy**[SL.2.4](http://www.corestandards.org/ELA-Literacy/SL/2/4/) I can present appropriate facts and details using complete sentences.**W.2.8** I can answer questions about my dinosaur in complete sentences. **Collaboration Success Skill**I can collaborate with my teammates in preparing for our presentation. | Collect scriptsProtocol feedbackReflection on revisions | Have students write scripts to help them prepare for the presentationModel the Critical Friends protocol* Show Austin’s Butterfly
* Use critical friends to give feedback to groups
* Allow time for revisions as needed
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| **Managing the Project** | **Learning Objectives/Targets** | **Checkpoints/Formative Assessments** | **Instructional Strategies** **for All Learners** |
| Phase 4: Present Product/ Answers to DQ* Assess w/ public product rubric
* Individual and team reflection
 | *Ex. I can articulate the answer to the DQ through my Public Product.* | *Feedback from audience**Reflection on feedback* | *Prepare students and audience for presentations* |
| I can present with my team information about the dinosaur we studied.I can answer questions about our exhibit.I can reflect on my learning through this experience. | Paleontologist will use rubric to provide feedbackOthers will use a 3-2-1 summarizer to notes their learningCollaboration evaluation* Peer evaluation
* Self-evaluation
* Teacher evaluation
 | Go over how to use the rubric and the summarizer with audience membersUse Fishbowl Discussion to guide team reflection on the feedback and on the learning experienceIndividually students will reflect in writingFollow up thank you notes to all involved |