**Kiser Middle School**

**Lesson Plan Template**

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| --- | --- | --- | --- |
| **SUBJECT** | **Science** | **GRADE** | **8** |
| **DATE** | **9/13** | **PERIOD** | **All** |
| **Common Core Standards** | 8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and  radioactive dating). | | |
| **Essential Question** | **How can the age of rock layers, fossils, and the Earth be inferred?** | | |
| **I Can Statements** | **.....explain relative age, absolute age and the difference.**  **…..use the Law of Superposition to date fossils in rock layers.**  **…..use Radiometric Dating to tell the age of fossils and rock layers.**  **…..explain how unconformities are interpreted in rock layers.**  **…..use index fossils in determining the relative age of fossil in various locations.** | | |
| **Vocabulary** | **Relative age, absolute age, Law of Superposition, radiometric dating daughter atoms, parent atoms, index fossil, radioactive decay, half-life, radiation, igneous rock, extrusion, fault, isotope, Carbon14** | | |
| **H.O.T. Question(s) Higher Order Thinking Questions** | **How can the rock layers in different parts of the world be compared in terms of age?**  **How does the process of radioactive decay allow us to determine the age of a rock or a fossil?**  **Explain how the process of radioactive decay of atoms is different than continually dividing a number by two.**  **If a squirrel gets run over by a car, what needs to happen for it to become a fossil?**  **How is fossil evidence used to explain the environmental conditions that existed in the Earth’s past?** | | |
| **Material/**  **Manipulatives** | **Pictures of various fossils with dates, pictures of sedimentary rock layers, index cards, fossil for lab, pennies** | | |
| **Technology Integration** | **Power Point presentations on Law of Superposition and Radiometric Dating** | | |
| **Warm Up** | **Continue to show kitchen objects and have students describe and then predict what they were used for.** | | |
| **Hook/**  **Cultural Connection** | **Ask students who likes a mystery? Follow this up by explaining that the Earth’s past is a mystery. Fossils offer clues and understanding the order things happen can help us better understand what might happen in the future.** | | |
| **Me: Modeled** | **Power Point presentation about the Law of Superposition.**  **Grand Canyon Video Clip** <https://www.youtube.com/watch?v=YgE-dSx-fPc>  **Have students write down names of rocks discussed and** | | |
| **We: Shared** |  | | |
| **Minute By Minute Assessment** |  | | |
| **Few: Guided Practice** |  | | |
| **You: Independent Practice** | **Students will be given practice worksheet that will allow them to use skills in coming up with age of rock layers and fossils using the Law of Superposition.** | | |
| **Summary** | **Quick review of law of superposition with textbooks: they are stacked and you ask students which ones have been stacked the longest.** | | |
| **Corrective Instruction** | **Make sure students are getting connection between order of layers and age of layers.** | | |
| **What is Going On?** | **Day 1-Law of Superposition Power Point, Students work through examples.**  **Day 2-Students work to figure out Bubba Drops the Box Activity.**  **Day 3-Quiz on Fossils, Index Fossil Matching and Notes.**  **Day 4-Ice Cores & Tree Rings**  **Day 5-Radiometric Dating Power Point, Index Cards,**  **Day 6-Absolute Dating word problems** | | |

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**Lesson Plan Template**

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| --- | --- | --- | --- |
| **SUBJECT** | **Science** | **GRADE** | **8** |
| **DATE** | **9/14** | **PERIOD** | **All** |
| **Essential Standards** | 8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and  radioactive dating). | | |
| **Essential Question** | **How can the age of rock layers, fossils, and the Earth be inferred?** | | |
| **I Can Statements** | **.....explain relative age, absolute age and the difference.**  **…..use the Law of Superposition to date fossils in rock layers.**  **…..use Radiometric Dating to tell the age of fossils and rock layers.**  **…..explain how unconformities are interpreted in rock layers.**  **…..use index fossils in determining the relative age of fossil in various locations.** | | |
| **Vocabulary** | **Relative age, absolute age, Law of Superposition, radiometric dating daughter atoms, parent atoms, index fossil, radioactive decay, half-life, radiation, igneous rock, extrusion, fault, isotope, Carbon14** | | |
| **H.O.T. Question(s) Higher Order Thinking Questions** | **How can the rock layers in different parts of the world be compared in terms of age?**  **How does the process of radioactive decay allow us to determine the age of a rock or a fossil?**  **Explain how the process of radioactive decay of atoms is different than continually dividing a number by two.**  **If a squirrel gets run over by a car, what needs to happen for it to become a fossil?**  **How is fossil evidence used to explain the environmental conditions that existed in the Earth’s past?** | | |
| **Material/**  **Manipulatives** | **Replica fossils along with reading guides.** | | |
| **Technology Integration** | **None** | | |
| **Warm Up** | **Review relative age and how it is found. Show fifth kitchen tool and ask students to describe and predict.** | | |
| **Hook/**  **Cultural Connection** | **Ask students if they had every dropped a set of something and how did they get it back into the right place.** | | |
| **Me: Modeled** |  | | |
| **We: Shared** |  | | |
| **Minute By Minute Assessment** |  | | |
| **Few: Guided Practice** | **Students work together to complete Bubba Drops the Box Activity** | | |
| **You: Independent Practice** | **Bubba Dropped the Box questions and lab write up, due Thurs 9/20. Kitchen writing assignment due Tues 9/18.** | | |
| **Summary** | **Ask students to brain storm about how they might figure how the correct box lid.** | | |
| **Corrective Instruction** | **Make sure all students are getting information about each fossil type.** | | |
| **What is Going On?** | **Day 1-Law of Superposition Power Point, Students work through examples.**  **Day 2-Students work to figure out Bubba Drops the Box Activity.**  **Day 3-Quiz on Fossils, Index Fossil Matching and Notes.**  **Day 4-Ice Cores & Tree Rings**  **Day 5-Radiometric Dating Power Point, Index Cards,**  **Day 6-Absolute Dating word problems** | | |

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**Lesson Plan Template**

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| --- | --- | --- | --- |
| **SUBJECT** | **Science** | **GRADE** | **8** |
| **DATE** | **9/17** | **PERIOD** | **All** |
| **Essential Standards** | 8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and  radioactive dating). | | |
| **Essential Question** | **How can the age of rock layers, fossils, and the Earth be inferred?** | | |
| **I Can Statements** | **.....explain relative age, absolute age and the difference.**  **…..use the Law of Superposition to date fossils in rock layers.**  **…..use Radiometric Dating to tell the age of fossils and rock layers.**  **…..explain how unconformities are interpreted in rock layers.**  **…..use index fossils in determining the relative age of fossil in various locations.** | | |
| **Vocabulary** | **Relative age, absolute age, Law of Superposition, radiometric dating daughter atoms, parent atoms, index fossil, radioactive decay, half-life, radiation, igneous rock, extrusion, fault, isotope, Carbon14** | | |
| **H.O.T. Question(s) Higher Order Thinking Questions** | **How can the rock layers in different parts of the world be compared in terms of age?**  **How does the process of radioactive decay allow us to determine the age of a rock or a fossil?**  **Explain how the process of radioactive decay of atoms is different than continually dividing a number by two.**  **If a squirrel gets run over by a car, what needs to happen for it to become a fossil?**  **How is fossil evidence used to explain the environmental conditions that existed in the Earth’s past?** | | |
| **Material/**  **Manipulatives** | **None** | | |
| **Technology Integration** | **None** | | |
| **Warm Up** | **Have students brain storm ideas about how we could tell if the relative age of a fossil found in England and one found in the United States might be similar.** | | |
| **Hook/**  **Cultural Connection** |  | | |
| **Me: Modeled** | **Demonstration of how index fossils can be used to date rock layers in various parts of the world.** | | |
| **We: Shared** |  | | |
| **Minute By Minute Assessment** |  | | |
| **Few: Guided Practice** | **Students work together on Index Fossil Matching Activity.** | | |
| **You: Independent Practice** | **Fossil Types Quiz** | | |
| **Summary** | **Have students explain why an index fossil gives a better relative age than other types of fossils.** | | |
| **Corrective Instruction** | **Students will have trouble seeing that if index fossils are found in two places in the world that those layers are the same age. Help them understand by asking if they could give an approximate age to a video of a NBA game is Michael Jordan was playing in the game.** | | |
| **What is Going On?** | **Day 1-Law of Superposition Power Point, Students work through examples.**  **Day 2-Students work to figure out Bubba Drops the Box Activity.**  **Day 3-Quiz on Fossils, Index Fossil Matching and Notes.**  **Day 4-Ice Cores & Tree Rings**  **Day 5-Radiometric Dating Power Point, Index Cards,**  **Day 6-Absolute Dating word problems** | | |

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| --- | --- | --- | --- |
| **SUBJECT** | **Science** | **GRADE** | **8** |
| **DATE** | **9/18** | **PERIOD** | **All** |
| **Common Core Standards** | **8.E.2.2** | | |
| **Essential Question** | **How do ice cores help scientists better understand the Earth’s past climate and atmosphere?**  **How can data from ice cores help scientists predict the future of the Earth’s climate and atmosphere?**  **How do tree rings help scientists understand the recent past and patterns in the Earth’s climate?** | | |
| **I Can Statements** | **…..collect data from ice cores.**  **…..analyze data from ice cores and make predictions about the Earth’s past and the Earth’s future climate.** | | |
| **Vocabulary** | **Methane, carbon dioxide, sulfur dioxide, volcanic ash, tree rings** | | |
| **H.O.T. Question(s) Higher Order Thinking Questions** | **How can ice cores show us when the Earth has heated up?**  **How can ice cores show us when the Earth has cooled down?**  **How can ice cores be used as predictors of the climate trends in the future?**  **How would an ice core from a time when the Earth was heating up compare with a time when it was cooling down?**  **How is additional methane or carbon dioxide in the Earth’s past atmosphere detected?** | | |
| **Material/**  **Manipulatives** | **Prepared ice cores with different colors of material to indicate different gases and volcanic ash** | | |
| **Technology Integration** | **Video Clip about Ice Cores**  **Video Clip about Tree Rings** | | |
| **Warm Up** | **Unpack suit case in front of students. Tell them you want them to try and figure out what kind of trip the person must have been on based on the suit case.** | | |
| **Hook/**  **Cultural Connection** | **Kids know that the polar bears are in trouble. Connect this to the research done on ice cores.** | | |
| **Me: Modeled** | **Ice Cores** <https://www.youtube.com/watch?v=iSb0DUn79dY>  **Utah Tree Rings** <https://www.youtube.com/watch?v=xmZO7aRgcW4> | | |
| **We: Shared** |  | | |
| **Minute By Minute Assessment** |  | | |
| **Few: Guided Practice** | **Students will use the following website** <https://scied.ucar.edu/tree-ring-interactive> **to learn what can be found by examining tree rings. It is interactive so we will need computers. Students will work in pairs.** | | |
| **You: Independent Practice** | **Students will work with the assignment from this link to prepare a graph and answer some questions.** <https://www.esrl.noaa.gov/gmd/outreach/info_activities/pdfs/CTA_the_story_is_in_the_ice.pdf> | | |
| **Summary** | **Show movie clip of Mt. St Helen’s 1980 eruption. Ask students to list three things that might be found in ice cores from this time.**  <http://climatechange.umaine.edu/icecores/IceCore/Home.html>  <https://www.youtube.com/watch?v=IhU6jml6NY4> | | |
| **Corrective Instruction** | **Students will think that the ice cores can be further back in time than they are. Make sure they understand how far back ice cores can take us.** | | |
| **What is Going On?** | **Students will be doing two activities in class. The Tree Ring simulation should be completed in class. The Ice Core might have to be finished at home.** | | |

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| --- | --- | --- | --- |
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| **DATE** | **9/20** | **PERIOD** | **All** |
| **Essential Standards** | 8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and  radioactive dating). | | |
| **Essential Question** | **How can the age of rock layers, fossils, and the Earth be inferred?** | | |
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| **Material/**  **Manipulatives** | **Index Cards** | | |
| **Technology Integration** | **Power Point presentation Radiometric Dating** | | |
| **Warm Up** | **Have students draw a circle and shade half of it. Have them keep doing this for five times.** | | |
| **Hook/**  **Cultural Connection** | **Radiation is all around us. Connect x-rays to what we are doing. Explain how radiation is energy and can be measured.** | | |
| **Me: Modeled** | **Power Point presentation about Radiometric Dating,** | | |
| **We: Shared** | **Students will tear index cards under my direction. They will then be asked to explain what we did in terms of the power point presentation.** | | |
| **Minute By Minute Assessment** | **Watch for students who are not engaged in process.** | | |
| **Few: Guided Practice** | **Students will have set of pennies and as a class we will use these to represent radioactive decay.** | | |
| **You: Independent Practice** | **Radiometric Dating Word Problems** | | |
| **Summary** | **Have students go back to their circles and explain why they did what they did and how it is connected to radiometric dating.** | | |
| **Corrective Instruction** | **Students will struggle with understanding that in each half life, half of the material that is present decays. Keep reminding them of the index cards.** | | |
| **What is Going On?** | **Day 1-Law of Superposition Power Point, Students work through examples.**  **Day 2-Students work to figure out Bubba Drops the Box Activity.**  **Day 3-Quiz on Fossils, Index Fossil Matching and Notes.**  **Day 4-Ice Cores & Tree Rings**  **Day 5-Radiometric Dating Power Point, Index Cards,**  **Day 6-Absolute Dating word problems** | | |

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**Lesson Plan Template**

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| --- | --- | --- | --- |
| **SUBJECT** | **Science** | **GRADE** | **8** |
| **DATE** | **9/21** | **PERIOD** | **All** |
| **Essential Standards** | 8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and  radioactive dating). | | |
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| **Material/**  **Manipulatives** | **Index cards** | | |
| **Technology Integration** | **None** | | |
| **Warm Up** | **Continuation of 9/19** | | |
| **Hook/**  **Cultural Connection** | **Continuation of 9/19** | | |
| **Me: Modeled** | **Short videos to explain how radioactive decay works.**  **Grand Canyon Dating** <https://www.youtube.com/watch?v=cpnIxlDVmHw>  **Carbon 14 Dating** <https://www.youtube.com/watch?v=fx3BqQ44zDE>  **C-14 Smithsonian** <https://www.youtube.com/watch?v=fx3BqQ44zDE>  **Model how to use radioactive decay to work from present to past and get an age.** | | |
| **We: Shared** | **Check homework and demonstrate with students showing work.** | | |
| **Minute By Minute Assessment** | **Monitor and provide feedback on process.** | | |
| **Few: Guided Practice** | **Groups will be given a radioactive decay problem to solve. Other groups will then evaluate their solution.** | | |
| **You: Independent Practice** | **In class, students will work on radioactive decay problems. Students with mastery will be assigned as mentors to others.** | | |
| **Summary** | **Have students compare and contrast relative and absolute dating.** | | |
| **Corrective Instruction** | **Biggest problem is getting students to work backwards to get the age of something. Again, use the index cards to help them connect.** | | |
| **What is Going On?** | **Day 1-Law of Superposition Power Point, Students work through examples.**  **Day 2-Students work to figure out Bubba Drops the Box Activity.**  **Day 3-Quiz on Fossils, Index Fossil Matching and Notes.**  **Day 4-Ice Cores & Tree Rings**  **Day 5-Radiometric Dating Power Point, Index Cards,**  **Day 6-Absolute Dating word problems** | | |