SAO Planning Pages

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| **Course/Grade Level Information** | |
| Course Name | Life Science |
| Brief Course Description | Sixth grade focuses on an introduction to physical, life science, and earth space science in which they explore basic science concepts in from both texts and a laboratory setting. |
| Grade Level(s) | Grade 6 |
| Course Length | Year-long |

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| **Teacher Information** | |
| Teacher Name | Scott Franklin |
| School Name | Our Middle School |
| District name | Polk County School District |

**Directions for Establishing a Learning Goal:** After completing the entire table, use the planning information and the SMART Review to write the description of the learning goal.

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| **Learning Goal:** A description of what students will be able to do at the end of the course or grade based on course- or grade-level content standards and curriculum. | |
| **Planning Information for Writing the Learning Goal:** | |
| Which big idea is supported by the learning goal? | Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering. |
| Which content standards are associated with this big idea?  *List all standards that apply, including the text of the standards (not just the code).* | Big Idea 1  SC.6.N.1.5: Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence  Big Idea 3  SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks.  Big Idea 6  SC.6.E.6.1: Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.  Big Idea 7  SC.6.E.7.2: Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.  SC.6.E.7.3: Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.  SC.6.E.7.4: Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.  SC.6.E.7.5: Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.  SC.6.E.7.9: Describe how the composition and structure of the atmosphere protects life and insulates the planet.  Big Idea 13  SC.6.P.13.1: Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.  SC.6.P.13.3: Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both. |

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|  | Big Idea 14  SC.6.L.14.1: Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.  SC.6.L.14.2: Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.  SC.6.L.14.3: Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.  SC.6.L.14.4: Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.  Big Idea 15  SC.6.L.15.1: Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.  LAFS.68.WHST.1.2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.  LAFS.68.WHST.24: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. |
| Why is this learning goal important and meaningful for students to learn? | Within the scientific community models are an important mechanism for advancing scientific understanding. This involves the construction, validation and application of scientific models. Using models helps students make sense of their observations, and understand abstract ideas through the visualisation of   * objects that are too big, too small or positioned so it is difficult for them to be seen easily (e.g. an ecosystem, cell, heart) * processes that cannot easily be seen directly( e.g. digestion) * abstract ideas (e.g. particulate nature of matter, energy transfer). |
| In what ways does the learning goal require students to demonstrate deep understanding of the knowledge and skills of the standards or big idea being measured? | Students who become actively involved in using models in their learning have been shown to gain a deeper understanding of the concepts and processes about which they are learning. The development of a scientific model for a complex concept, interpreting the information gained from the model, and being able to formulate conclusions represents strategic thinking which is a DOK Level 3 for this learning goal. |
| Describe the instruction and strategies you will use to teach this learning goal.  *Be specific to the different aspects of the learning goal.* | * Throughout the course of the school year students will be exposed to the use of models to help them make sense of observations and concepts. * Different types of models will be used in instruction including scale models, analogue models, mathematical models, and theoretical models. * Students will be taught the purpose and use of the model along with the following thinking skills: * **recognizing** the similarity between models and the things they represent, e.g. recognizing what is and isn’t a model of the heart * **assessing** the strengths and limitations of models in explaining and predicting the behavior of the objects or phenomena they represent * **creating models** to explain things that cannot be observed directly e.g. acquiring images and understandings that come from drawing, painting, sculpting, music, role play * **using models** to raise questions, communicate ideas, and test hypotheses in many different contexts e.g. carrying out an experiment with a model that is not possible or practical to do with the real thing * Students will then be asked to draw, build, and design a variety of models of phenomena. They will use these models in their explanations and refine these models as a class, in groups and individually, growing in ability to use these models and explain them as their understanding of science concepts increases. Using a variety of model types will help to differentiate material as well, with more sophisticated models being expected of advanced students, while a variety of simplified models will help students lacking understanding to better access the material. * Students will use modeling and other rubrics throughout year as they assess their own work and peer’s work, and as expectations are explained. Samples of effective work in these areas will be provided, as will scaffolding strategies. * Students’ scientific work will be linked to the world around them to deepen their understanding and be more culturally relevant. |
| Identify the time span for teaching the learning goal (e.g., daily class-45 minutes for the entire school year). | This learning goal is a year-long focus that occurs multiple times during each quarter depending upon the science concepts being studied. |
| Explain how this time span is appropriate and sufficient for teaching the learning goal. | This time is appropriate to embed the teaching of modeling, opportunities for students to engage with peers for using and creating models, and for students to be able to create their own models within the actual science concepts being taught. |

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| **Check:** **SMART Review of the Learning Goal for this SLO** | |
| Use the SMART protocol to confirm that the Learning Goal has the right size, detail, and depth necessary.  Check the boxes that apply. | The Learning Goal is:  **Specific** –focused on the big idea and content standards.  **Measurable** – able to be appropriately and adequately assessed (note the Assessments section will identify the specific assessment to be used).  **Appropriate –** within the teacher’s control to effect change and is important, meaningful for students to learn during the identified time span.  **Realistic –** while ambitious, it is achievable for both teachers and students, during the time span identified.  **Time Limited** **–** can be summatively evaluated within the time under the teacher’s control. |

**Directions for Documenting Assessments and Scoring:** After completing the entire table, use the planning information to write the description and use of assessments and scoring criteria or rubrics.

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| **Assessments and Scoring:** Assessments should be standards-based, of high quality, and designed to best measure the knowledge and skills found in the learning goal of this SLO. The assessment should be accompanied by clear criteria or rubrics to describe what students have learned. | |
| **Planning Information for Explaining the Use of Assessments and Scoring:** | |
| How often will you collect data to monitor student progress toward this learning goal? | Formative story problems will be administered every 2 weeks to plan for differentiated instruction. During instructional time, students will work as pairs and small groups to solve and create their own story problems which will be monitored on a regular basis. |
| How will you use this information to monitor student progress and to differentiate instruction for all students toward this learning goal? | The collected data will reveal specific information about the students’ ability to add and subtract, as well as to solve real-world story problems and to develop flexible strategies. Consequently, tiered student groups can be formed based on the data with an instructional focus on the exact skills needed. Student work and classroom performance, both formal and informal, will be observed daily and analyzed for the students’ ability to demonstrate an understanding of number sense. |

**Directions for Establishing Targets:** Use the planning information to guide how you will use previous performance to set baseline data as well as to establish expected targets.

| **Targets:** identify the expected outcomes by the end of the instructional period for the whole class as well as for different subgroups, as appropriate. | |
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| **Planning Information for Writing the Target Used to Define Teacher Performance:** | |
| Describe the courses, assessments, and/or experiences used to establish starting points and expected outcomes for students’ understanding of the learning goal. | The baseline data used to establish the starting points for students include:   * District writing assessment scores from the past three years for grade 6 reveal that students struggle the most with providing supporting details which is a skill essential to a scientific explanation. * State testing suggests that students are weak in the evaluation of models, inferences, and experimental results which includes skills of evaluating and using models. * Beyond standardized tests, classroom- and school-based assignments reveal a need to focus on writing explanations and modeling. * Student attendance and disciplinary reports.   These data points were used to set students actual performance in the 4-tiered groups for the SAO targets. |
| Explain how the expected targets identified demonstrate ambitious, yet realistic goals, for measuring students’ understanding of the learning goal. | These targets are both ambitious and realistic for a sixth grade yearlong science goal. Previous years have demonstrated that although some students leave sixth grade with improvement in the writing and use of models, most have not improved sufficiently. Students will be given many opportunities within each unit to learn about and to use different types of models, to observe the teacher and peers using models to discuss concepts, to demonstrate understanding by explaining concepts orally when using a model, and transitioning to writing these concepts when creating a model. Students who perform significantly below proficiency will also be receiving individualized guidance and assistance in order to improve at least one level on some of the criteria. |