Grade Level	4th	**Content Area**	Science
Course Title (grades 9-12 Only)			
Length of Unit	11 days	**Time of Year**	3rd Qtr
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students will need to be aware of the scientific process, they also need to be aware of science safety and conduct rules. Students need to be aware of classifying and sorting, as well have base understating of measurement, time, and temperature concepts. Students should have base understanding of collecting data and creating charts or graphs to represent and analyze data.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Current school programming supports peer reviewed research based interventions and strategies by way of Applied Behavioral Analysis (ABA), Discrete trial Therapy (DTT) , and the use of Pivotal Response Therapies. Students should have base skills of sharing information through discussions and collaborative groups.		
Standard Number and Description *List the Number* and full description for the required Standard.*	4.1.3.1-Inquiry Process-Analysis and Conclusions (Organize and analyze data; compare to predictions). Analyze data obtained in a scientific investigation to identify trends.		
Summative Assessment *Describe a cumulative and comprehensive activity, clearly separate from instruction and guided or independent practice, which allows each student to individually demonstrate mastery of the required Standard. A copy of the summative assessment must be attached to the curriculum sample.*	After studying and completing investigations on the States of Matter and the changes or variables that affect states of matter students should be able to: generate a specific questions, create a hypothesis, conduct an experiment, collect data, analyze or represent their data, then come to a conclusion and present their findings. Students should also be able to comment and analyze a peer's presentation and give positive or helpful feedback.		
Scoring Scale and Mastery Level *Explain how the assessment is scored, to include points per question, how points are awarded, total points possible, criteria necessary to demonstrate mastery, and grading scale. A copy of the answer key and scoring rubric (whichever applicable) must be attached to the curriculum sample.*	Students will be scored on a rubric, with defined areas based on scientific process. Scoring will look at the connection of key scientific concepts as they relate to States of Matter. Scoring will connect students ability to present information clearly on three-paned presentation board, with all key areas defined along with a clear verbal explanation of their experiment. Other areas looked at will be ability to give clear constructive peer feedback. Scoring rubric attached. Scoring is based 1 through 4. A score of 1 denotes a lack of understanding, while a score of 4 would denote proficiency in the area. Students have ability to earn 28 full points from the rubric if they were to clear all proficient scores of (4). 22/28 or higher= proficient skills 18-21 – clear understanding 10- 18-Emerging in understanding 0-10- limited understanding		

Materials/Resources Needed	Board, various skill sheets, Investigation Sheets, 3-pane project boards, various objects to measure and observe changes of matter, Online Video on Matter, Interactive Skill Activity, teacher laptop.

Lesson (add as needed)	Instruction	Student Activities
1	The teacher will start the unit off stating that the class will be doing an investigation on **States of Matter.** The teacher will introduce a Properties of Matter Video on her laptop. <u>Key concepts students should gain:</u> All objects have physical properties that can be measured. Matter exists in different states. Matter can change from one state to another by heating and cooling. Students will be given a sheet to take notes on specified vocabulary words that are discussed in the video (i.e. matter, mass, volume, property). After the video the teacher will lead a discussion on states of matter, what and where we see it (solids, liquids, gases). The teacher will explain that the students will take part in a scientific investigation about states of matter and their properties. Students will be utilizing the inquiry process, as well as gathering and analyzing data, and making predictions. The teacher will go over the Scientific Inquiry Model, and the steps involved in completing the process. The first activity students will take part in is a class activity called. *States of Matter classification.* The teacher will pass out a classification sheet that lists different states of matter. Students will work in pairs to classify into categories of solids, liquids or gases. The sheet will contain 15	Students will view sates of matter video, presented via video on teacher's laptop. Students will fill out questions related to the video as they view the video. Students will share answers via whole group discussion after the video is complete. Students will then pull out their Science Journals and take notes from the direct instruction from the teacher. Students will take notes on the Scientific Process, and the steps involved in completing their own inquiry. Students will then work in partners to complete a 15 question classification sheet on states of matter. Students will then write down their homework for the night- Classifying States of Matter in their own home environment Sorting Chart.

	random things that will need to be classified in the chart on the sheet. The teacher will take this group work time to monitor students' cooperative learning skills, as well s ability to address the classifying tasks. **Homework:** Students will be given a States of Matter sorting chart to take home. Students are to categorize items in their own home environment into solids, and gases.	
2	The teacher will have students pull out their States of Matter Sorting charts that they had from homework, and allow students to find a partner to review the items that they each found in their home environment. Students should compare the similar and different items that they categorized on their lists. Once students have had some time to review their list with their partners, they will have the opportunity to come up and share the similarities and differences with the whole class. For the day's lesson, students will be looking at changes in matter. The teacher will go over the related vocabulary, connecting volume and mass, and temperature. The teacher will lead students in creating a *concept map* on states of matter. The teacher will pass out a Project Rubric. The teacher will discuss the research project students will be completing on investigating states of matter. The teacher will go over the requirements, as well as criteria of what the project will require: Three-Pane Poster Board, with stated: (Question-Investigation, Hypothesis, Experiment, Investigation, Data, Results and Conclusion). Each project must have picture or visuals to demonstrate steps in the experiment and detailed data utilizing charts and or graphs.	Students will pull out their States of Matter Homework Sorting charts and work with a partner in comparing the items that they each have identified in their home environments. Students will reduce their list down to similarities and difference that they each have and present them to the class. Students will pull out their Science Journals and take notes and write examples as the teacher goes over related vocabulary for the unit. The students will then participate whole group in completing a Concept map on States of Matter, they will be able to use at a later time for their unit quiz. The students will receive their Project directions and rubric, for investigations that they will have to complete for their science project, utilizing the Scientific process.

3	The teacher will demonstrate a full experiment with the class. The teacher will begin the discussion by having students brainstorming what makes up matter (atoms) and, where students see changes in matter (i.e. weather, temperature, foods). The teacher will explain and *review science safety and rules*, as the teacher leads them in two experiments for the period. Students will be put into working pairs in the lab. Today students will be looking at chemical changes. The teacher will explain the two experiments the students are to complete, along with the observational experiment packets they are to complete. *Students will be looking at Physical and Chemical Changes, via the Scientific method, and analyzing data to investigate trends.* *<u>Students will be answering a specific experimental question and developing a hypothesis, collecting the data then writing the conclusions from the mini experiments.</u>* The 1st experiment will look at Melting fudge and looking at the temperature, as well as the amount of time it takes for it to make its state of change. The 2nd experiment will take a look at punching chalk. This would be looking at physical change by force, or energy. **Experiments will continue for 5 days, things looked are temperature changes, physical, chemical, and gas changes.**	Students will pull out their science journals and participate in taking notes and discussion on what matter is, and where they see it. Students will also participate in reviewing science safety rules. Students will take part in completing two specified experiments on Physical and Chemical changes with a partner, answering specific experimental questions in their exploration, developing a hypothesis, testing, collecting data, analyzing it, then stating a conclusion to the experiment. Students will participate in experiments for a week with their partners and completing investigation packets on the outcomes of the experiments that they conduct.
4	The teacher will have students brainstorm what experiments they plan on completing for their Investigation projects on Matter. The teacher will review the Grading rubric, as well as project requirements. Students will present their investigations at the end of the Unit. Students will have time to brainstorm what they would like to	Students brainstorm what project or investigation they will complete. Students will meet one-on-one with the teacher to conference about their ideas. Students will then participate in board activities. Students will

	complete their experiment on. Examples of appropriate experiments would be: *Looking at what temperatures make certain forms of matter change, how volume or mass of an object affect how it changes its state, or how time affects states of matter*. Students must then present their idea to the teacher and conference what they intend to conduct their investigations on. Students will sign up between four assigned days to present their projects. While each student presents, the other students watching will complete a peer response sheet on one thing that was highly interesting about their peer's project, and something else they would like to know. The sheets will be added to the students overall score sheet. Once done with conference with the teacher, the teacher will set up a center based activity students will complete on states of matter. **Homework:** States of Matter-take home quiz, students can utilize notes.	have opportunity to participate in center based activity on states of matter. Students will then pick up their homework for the night at the end of the period, a take home quiz on States of Matter.
5	The teacher will review the grading rubric with students for their project presentations. The teacher will also pass out the peer response sheets that student will use to comment on their peers projects.	Students will present their investigations to the class. Students watching will provide feedback or peer response in relation to the investigations that they have viewed. Students will be given their grade as well as teacher/peer reviews after all investigations have been presented.

Summative Assessment

For the States of Matter Investigations Science Project, students will:

- Come up with a scientific experiment
- Create a scientific question
- Create a hypothesis
- Create an experiment that will clearly test the hypothesis
- Collect data as well as create a way to represent data clearly on their presentation boards.
- Clearly state the conclusion of the investigation while connecting key scientific concepts related to concepts of matter connecting vocabulary.
- Clearly present their investigation(via oral ,visual presentation)
- Comment constructively on peers presentations

Students will be presented scores on Investigation Rubric after all presentations are completed.

Arizona Autism Charter School
States of Matter Investigations

Name: _____ Date:_____

	1	2	3	4	
Generates Scientific Question	Question developed is weak in operation lacks clear inquiry	Question developed shows partial understanding. Lacks connection to key concepts.	Question developed shows understanding of experimental investigation	Questions developed show thorough understanding of scientific/ experimental investigation	____
Stated Hypothesis	Lacks true inquiry, hard to define what is being looked at.	Hypothesis present, but hard to clearly define what is being investigated.	Hypothesis is stated clearly on board	Hypothesis is clear and defined and represented on presentation board clearly	____
Conducts Experiment	Experiment lacks full inquiry process.	Experiment not thoroughly completed enough to detail, changes, or components of stated hypothesis.	Completed experiment, some parts of inquiry process missing	Completed experiment, making adjustments as necessary following inquiry process.	____
Collects data, and develops appropriately clear manner to display data.	Lack of relevant data presented, hard to decipher data in presentation	Data present, but does not clearly represent all variables experimented	Data collection appropriate and is presented on presentation board clearly.	Data collection and way analyzed in reference to question and hypothesis clearly tied together.	____

				Presented in clear concise manner.	
Defined Conclusion	Lack of clear conclusion to investigation	Conclusion present but not clearly defined.	Conclusion presented connecting hypothesis	Conclusion presented connecting, data, hypothesis and investigation question clearly. Connects concepts to states of matter	____
Overall Presentation	Presentation hard to follow, information did not follow step by step the scientific process. Board not organized.	Presentation clear, some components not clear on board, and or presentation.	Presentation strong, All necessary components are present on board.	Presentation very clear and concise, information organized very well on presentation board.	
Constructive Feedback	Gives feedback to peer on presentation.	Gives constructive feedback related to peers investigation	Gives constructive feedback related to 1 key concept from peers experiment, and presentation.	Gives constructive feedback, connecting at least 2 key concepts from peers experiment and presentation.	
				Total---->	____

Teacher Comments: