**Lesson Plan   
ETAP 524**

**SUMMER 2010**

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| Name: Melissa Filotas | Module: 4 |
| **Lesson Plan Title** | |
| Particles/Molecules in Motion | |
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| **Goals** | |
| Students will learn…   * the role of molecules and temperature in the formation of each state of matter. * to collaborate, use critical thinking skills, and use creativity. | |
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| **Objectives** | |
| Students will be able to…   * compare and contrast the movement and arrangement of molecules in each phase of matter. * explain how temperature affects the movement and arrangement of molecules. | |
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| **Discipline and Topic** | |
| This lesson will be one component of a fourth-grade science lesson on the three states of matter, liquid, solid, and gas. This lesson will explain how the arrangement and motion of molecules creates the three states of matter. | |
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| **Target Population** | |
| This lesson will be presented to a heterogeneous class consisting of 7 girls and 11 boys, including 2 ESOL; 4 below average, including 1 ESE; 2 above average students | |
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| **Curriculum Alignment** | |
| **This lesson satisfies the following NYS grade 4 science standards:**   * 3.1f – Objects and/or materials can be sorted or classified according to their properties. * 3.1g – Some properties of an object are dependent on the conditions of the present surroundings in which the object exists. For example:   + Temperature – hot or cold * 3.2a – Matter exists in three states: solid, liquid, gas.   + solids have a definite shape and volume   + liquids do not have a definite shape but have a definite volume   + gases do not hold their shape or volume * 3.2b – Temperature can affect the state of matter of a substance.   **ISTE FOR STUDENTS**   |  |  | | --- | --- | | **1.** | **Creativity and Innovation** | |  | Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students: | |  | |  |  | | --- | --- | | b. | create original works as a means of personal or group expression. |   c. use models and simulations to explore complex systems and issues. | |  |  | | **2.** | **Communication and Collaboration** | |  | Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students: | |  | |  |  | | --- | --- | | a. | interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media. | | d. | contribute to project teams to produce original works or solve problems. | | | **3.** | **Research and Information Fluency** | |  | Students apply digital tools to gather, evaluate, and use information. Students: | |  | |  |  | | --- | --- | | b. | locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. | | d. | process data and report results. | | | **4.** | **Critical Thinking, Problem Solving, and Decision Making** | |  | Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students: | |  | |  |  | | --- | --- | | b. | plan and manage activities to develop a solution or complete a project. | | c. | collect and analyze data to identify solutions and/or make informed decisions. | |   **ISTE FOR TEACHERS**  **1. Facilitate and Inspire Student Learning and Creativity**  Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments. Teachers:   |  |  | | --- | --- | | a. | promote, support, and model creative and innovative thinking and inventiveness. | | b. | engage students in exploring real-world issues and solving authentic problems using digital tools and resources. | | c. | promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes. | | d. | model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments. |   **2. Design and Develop Digital-Age Learning Experiences and Assessments**  Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS•S. Teachers:   |  |  | | --- | --- | | a. | design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity. | | b. | develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress. | | c. | customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources. | | d. | provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching. |   **4.** **Promote and Model Digital Citizenship and Responsibility**  Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices. Teachers:   |  |  | | --- | --- | | a. | advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources. | | b. | address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources. | | c. | promote and model digital etiquette and responsible social interactions related to the use of technology and information. | |  |  | | |
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| **Underlying Educational Theory** | |
| This lesson will support the constructivist theory because students will be responsible for their own learning. The teacher will act as a facilitator while the students gather and dispense knowledge. Students will engage in collaboration and critical thinking to produce knowledge. | |
| **Materials Description and Timing** | |
| |  |  |  | | --- | --- | --- | | **Parts of Lesson** | **Materials** | **Timing** | | Introduction (Hook, prior knowledge) | Hello stickers, Venn diagram, directions handout | 20 minutes | | Developmental Procedures (Simulations, video, questions, digital story, wiki) | BrainPop website <http://www.brainpopjr.com/science/matter/changingstatesofmatter>  Simulations  <http://phet.colorado.edu/en/simulation/states-of-matter>  <http://www.brainpopjr.com/science/matter/changingstatesofmatter>  Photo Story 3  Wiki website (<http://mfilotas.pbworks.com>)  Handout with Venn diagram and digital story/wiki directions | 120 minutes | | Closure (Human molecules, reflection) | Venn diagram/reflect | 20 minutes | | |
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| **Supplemental Materials/Links** | |
| * Interactive White Board * Hello stickers * Venn diagram * Handout with directions for assignments * BrainPop website (<http://www.brainpopjr.com/science/matter/changingstatesofmatter>) * Simulation website #1 (<http://www.harcourtschool.com/activity/states_of_matter>) * Simulation website #2 (<http://phet.colorado.edu/en/simulation/states-of-matter>) * Photo Story 3 * Wiki website (<http://mfilotas.pbworks.com>) | |
| **Lesson** | |
| **LOCATION: COMPUTER LAB**  INTRODUCTION:   * Each student receives a “Hello, my name is…” sticker (HOOK)   + Teacher tells students to fill in the name, “particle/molecule”   + Tell students to be thinking about why everyone is wearing the sticker and what it has to do with the lesson   + Students will have the entire class period to figure out the answer * Distribute three circle Venn diagram   + Students work in groups of three     - Students write everything they know or have learned about solids, liquids, and gases   + Whole-class discussion regarding answers to Venn diagram     - Using student responses, fill in Venn diagram using interactive whiteboard     - Teacher clears up misconceptions * Go over directions for today’s lesson by reviewing handout (attached)   + Use interactive whiteboard   + Answer questions about assignments * Keep students in the same groups of three   + Explain to students that these will be their groups for all activities today   + There will be three students to one computer   DEVELOPMENTAL PROCEDURES:   * Students visit the following websites: * <http://www.harcourtschool.com/activity/states_of_matter>   + <http://phet.colorado.edu/en/simulation/states-of-matter> * <http://www.brainpopjr.com/science/matter/changingstatesofmatter> * Each group of students will create five questions that correspond with the simulations and video by using the question frames provided on their directions handout.   + Use five of the following: What is the difference between \_\_\_ and \_\_\_?; What would happen if \_\_\_?; Why is \_\_\_ important?; How are \_\_\_and \_\_\_ similar?; What do you think causes \_\_\_\_?; Explain why \_\_\_\_.   + After creating the questions, they will answer them on a separate sheet of paper.   + Students will exchange their questions with another group and thoroughly answer them using the simulations and BrainPOP video. * Using the new questions and answers, students will create a digital story.   + There is no prescribed task.   + Students can be creative (see attached handout).   + For example, some groups might pretend that they are part of a TV station where viewers can ask questions of an expert.   + Students must include drawings to correspond with their answers.     - Students may create their drawings by hand and scan them into the computer or they can use Paint to produce drawings. * Students must include text to represent their questions and text or audio to represent their answers. * Students will upload digital stories to the class wiki (<http://mfilotas.pbworks.com>).   + PLEASE VISIT A SAMPLE DIGITAL STORY AT THE ABOVE WEBSITE.   + Groups discuss, suggest, and correct information with the group that they exchanged questions.   + The students should be able to create a good discussion since each group has answered their own set of questions plus the other group’s questions.   + Students will work in the same groups of three to compose the discussion posts.   CLOSURE:   * As a whole class, students guess why each is wearing a “Hello, my name is particle/molecule” sticker.   + If students do not guess the reason, the teacher will explain that each student is acting as a particle/molecule, and they need to arrange themselves in a solid, liquid, and gas. * Students, as a whole class, arrange and move themselves according to each state of matter. * Students, in the same groups of three, will reflect.   + Using the Venn diagram, add information that was learned today.   + Information can be in the form of drawings and/or text.   + The Venn diagram reflection will be graded. | |
| **Evaluation of Students** | |

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Activity** | **1 – Needs Improvement** | **2 – Fair** | **3 – Good** | **4 – Excellent** | | **Digital Story – Critical Thinking Questions** | Fewer than 3 thought-provoking critical thinking questions | 3 thought-provoking critical thinking questions | 4 thought-provoking critical thinking questions | 5 thought-provoking critical thinking questions | | **Digital Story – Critical Thinking**  **Answers** | Completely and accurately answers fewer than 3 critical thinking questions | Completely and accurately answers 3 critical thinking questions | Completely and accurately answers 4 critical thinking questions | Completely and accurately answers 5 critical thinking questions | | **Digital Story –**  **Creativity** | Creates a story that is minimally appealing to an audience; minimally accommodates several different learning styles | Creates a story that is somewhat appealing to an audience; somewhat accommodates several different learning styles | Creates a story that is for the most part appealing to an audience; for the most part accommodates several different learning styles | Creates a story that is appealing to an audience; accommodates several different learning styles | | **Digital Story – Participation** | Hardly:  Collaborates and contributes good ideas | Somewhat:  Collaborates and contributes good ideas | For The Most Part:  Collaborates and contributes good ideas | Completely:  Collaborates and contributes good ideas | | **Venn Diagram Reflection** | Hardly:  Reflects on the lesson’s learning to meet objectives | Somewhat:  Reflects on the lesson’s learning to meet objectives | For the Most Part:  Reflects on the lesson’s learning to meet objectives | Completely:  Reflects on the lesson’s learning to meet objectives | | **Wiki Participation** | Hardly:  Contributes to the discussion forum by making positive comments, suggestions, and corrections | Somewhat:  Contributes to the discussion forum by making positive comments, suggestions, and corrections | For the Most Part:  Contributes to the discussion forum by making positive comments, suggestions, and corrections | Completely:  Contributes to the discussion forum by making positive comments, suggestions, and corrections | | **Use of Computer – NETSS Standards** | Rarely:  Uses digital-imaging technology to modify/create works of art; conceptualize, guide, & manage group projects using digital tools; solves current hardware & software problems | Occasionally:  Uses digital-imaging technology to modify/create works of art; conceptualize, guide, & manage group projects using digital tools; solves current hardware & software problems | Most of the Time:  Uses digital-imaging technology to modify/create works of art; conceptualize, guide, & manage group projects using digital tools; solves current hardware & software problems | Always:  Uses digital-imaging technology to modify/create works of art; conceptualize, guide, & manage group projects using digital tools; solves current hardware & software problems |   **SCORE: \_\_\_\_\_ / 28** |
| **Evaluation of Lesson** |
| PLEASE NOTE: I evaluate all lessons in the same manner.I would expect 80% of my class to receive a final score of 23 or above on the four tasks listed in the rubric. This equates to approximately a grade of 82%. If my students do not perform at this level, I feel that I would need to revamp the lesson. Although I believe that these are quite achievable objectives for all students, I would not feel that the students met the objectives and/or mastered the content if 80% did not receive the above-mentioned score. It will be interesting to observe whether or not the children enjoyed this lesson using Photo Story 3 and wiki more than a traditional paper and pencil task. In order to compare the effectiveness of paper and pencil tasks, I would analyze the results of past formative assessments that were based on traditional methods and the results of the current assessments which were based on the Photo Story 3 digital story and wiki. These results would indicate whether or not the digital story and wiki lesson were a more successful means of understanding matter and its properties than traditional activities. It is my responsibility to observe whether the assignments were too easy (grasped the majority of objectives) or too difficult (failed to grasp the majority of objectives) for the students. In either case, I would need to change the method and/or the corresponding activities but not the objectives, since I believe they are reachable.Part of being an educator is being able to look critically at and evaluate oneself. Teachers cannot always assume that poor lesson mastery is the fault of the students. Poorly set up lessons can deter learning, and the students cannot be blamed. By being a reflective practitioner, I will use assessments and activities to evaluate not only students’ performance but also my performance as a teacher. In turn, this type of reflective practice will provide students with a more productive education. Besides looking at the students’ scores and the difficulty of the tasks, I can also observe how well the students are accessing their prior knowledge from the previous lesson and how well they are transferring this information to the next unit. Upon beginning the next lesson, if the students cannot apply their knowledge from this lesson, I know that I did not promote transfer of learning. Therefore, next year, I would need to add more and/or different activities, readings, and technological methods that encourage and foster comprehension of concepts. |
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| **Rationale for using the medium** |
| My lesson, entitled Molecules in Motion, includes three types of technology. The introduction of the lesson begins with simulations, a type of Computer Aided Instruction (CAI), while the developmental portion of the lesson allows the students to create a digital story by utilizing the visualization Mindtool, Photo Story 3. The lesson closure permits students to communicate through a class wiki, another type of Mindtool. All of these technologies promote the construction of knowledge through critical thinking and creativity.  According to Marc Prensky (2007), simulations allow students to try out alternatives and see exactly what will happen through experimentation. Many textbook concepts can be brought to life and made more concrete through the use of simulations. As Prensky (2007) notes, simulations will answer many of the “What if?” questions that are not answered through textbooks and other media because they provide life-like and three-dimensional visuals. Simulations allow students opportunities to understand complex ideas without damaging equipment or hurting themselves in the process (Prensky, 2007). He also notes that simulations work to promote understanding and that this tool will be a definite part of the professional life of today’s students (Prensky, 2007). NASA uses simulators to train astronauts, pilots are trained on them, and medical students practice operations through simulations rather than on cadavers (Prensky, 2007). Consequently, since virtually every job uses simulations, teachers must prepare students for the future by incorporating these CAIs into everyday learning. On a personal note, the internet and computer serve as interesting and engaging ways for students to use tutors/CAIs in make-believe and real life situations. Good tutor software makes learning more interesting. Simulations make abstract ideas and concepts more concrete because they are visual representations of real-world situations. The simulations and video that I have incorporated into my lesson serve as, “…a real key to helping our students understand the world” (Prensky, 2007). The simulations allow the students to manipulate and try out the effect of temperature on molecules, while the video permits students to gain understanding through interesting explanations that include animations, graphics, and engaging audio.  Egbet (2009) states, “…to promote critical thinking and reasoning, students need to think about and answer “essential” questions that help them to meet universal standards for critical thinking such as clarity, accuracy, precision, relevance, depth, breadth, and logic”. In my lesson, the simulations and video provide an excellent opportunity for students to create their own questions. The web sites are self-explanatory and easy to understand which allows for a constructivist approach to learning where the students act as the dispensers of knowledge and the teacher serves as a facilitator. King (1995) discusses a model of inquiry where the students learn to ask questions on their own instead of relying on the teacher to create the questions. I believe that the students can easily use King’s question frames to create critical thinking questions that are related to the simulations and video. The following are examples that I have included: What is the difference between \_\_\_ and \_\_\_? What would happen if \_\_\_? Why is \_\_\_ important? How are \_\_\_and \_\_\_ similar? What do you think causes \_\_\_\_? Explain why \_\_\_\_ (King, 1995, p. 14). By creating these critical thinking questions, the student will, “…induce high-level cognitive processes, such as analysis of ideas, comparison and contrast, inference, prediction, evaluation, and the like” (King, 1995, p. 14). As Halpern (1998) notes, critical thinking is an effortful process that requires a willingness to undertake a routine plan, open-mindedness, the ability to self-correct and start over, and the need to compromise in order to reach a consensus (p. 452). She believes that teachers must encourage the use of critical thinking skills in situations outside the current lesson (p. 452). Consequently, I believe that teaching how to formulate good questions is a skill that will promote higher-order thinking as well transfer to other situations, both in and out of school.  As Jonassen, Carr, and Yueh (1998) state in their article, “…technologies should not support learning by attempting to instruct the learners, but rather should be used as knowledge construction tools that students learn *with*, not *from*. In this way, learners function as designers, and the computers function as Mindtools for interpreting and organizing their personal knowledge” (p. 24). In my lesson, Photo Story 3 provides an excellent visualization Mindtool that the students can utilize to interpret and organize their understanding of molecules in the three states of matter. For example, when constructing digital stories or other digital Mindtools, such as concept maps, learners use critical thinking skills in order to create a product that makes sense and actually illustrates the concepts. Learners grasp concepts more easily when they design instructional materials, using Mindtools, that require manipulation of the content. These hands-on programs allow students to convert abstract concepts into concrete ones (Jonassen, Carr, &Yueh, 1998). In the past, everything had to be memorized, and there were limits to the amount of material that could be remembered. Nowadays, most students are not mandated to memorize content but rather to use a variety of resources for accumulating information. When students arrange this information into Mindtools, such as databases, spreadsheets, and visualization tools, they retain more than they would through memorizing. After using the Mindtool to process information, students are prepared to actually teach the concepts to the class. In an article by Jung Eun Shim and Yue Li, the authors make many of the same points as Jonassen, Carr, and Yueh, including types of Mindtools and the effectiveness of organizing knowledge through the use of these methods. I think that Jonassen and his colleagues would agree with the two authors’ statement regarding cognitive tools, “…people are relieved of the heavy burden of memorizing knowledge, and they can save energy for meaningful and effective learning such as critical thinking or reorganizing knowledge” (Shim & Li, 2006). I also incorporated a class wiki, another type of Mindtool, into the lesson because communication and production are two of the essential goals of 21st century learning (Egbert, 2009, p. 6). According to Goodwin-Jones, students tend to take more pride in their work if it is published and if they know that people will be commenting on their products (2003, p. 13).  The digital storytelling project offers the students an opportunity to be creative. As Egbert (2009) states, “Students can use paint software to create original art or to reconfigure photos and other graphics files” (p. 143). She believes that these creative tools allow students to exchange ideas and build on each other’s ideas along with teaching respect for other people and their ideas (pp. 137, 138). Since today’s students do not think twice about creating original content and sharing it online, digital storytelling is a creative outlet that corresponds with their daily activities (Educause, 2007). Additionally, “Digital stories let students express themselves not only with their own words but also in their own voices, fostering a sense of individuality and of “owning” their creations (Educause, 2007). Beaver and Moore (2004) encourage a model that supports the goals and objectives of the lesson, critical thinking and the multiple intelligences, and technology that sustains these areas (p. 44). Digital stories support the multiple intelligences and different learning styles by providing writing and oral activities for the verbal/linguistic learners, illustrations and diagrams for the visual/spatial learners, audio for the auditory learners, and even music, in the form of background ambiance for the musical/rhythmic learners. I believe that the digital storytelling activity in my lesson offers the students all of the above creativity aspects and will truly be an engaging endeavor in comparison with traditional paper and pencil activities.  I believe that computers enable a constructivist approach to teaching and learning. Although computers can find any sort of information, including a graphic organizer on molecules, the question remains: Are students really learning the information simply through retrieval? I believe that learners should accumulate information and then manipulate it, using Mindtools, to organize their thoughts. Through arranging the information, the students will understand the inner workings of the concepts. When students are required to manage and classify information into any kind of Mindtool, it forces the learner to use higher-order thinking skills. This, in turn, leads to a greater amount of retention of content as compared to memorization. Therefore, I believe that the following quote sums up my feelings about the computer as a tool to promote constructivism: “Learners should be responsible for recognizing and judging patterns of information and then organizing it, while the computer system should perform calculations, store, and retrieve information” (Jonassen, Carr, Yueh, 1998).  Beaver, R., & Moore, J. (2004). Curriculum design and technology integration. *Leading and*  *Learning with Technology*, *32*(1), 42-45.  EDUCAUSE Learning Initiative. (2007). 7 things you should know about digital storytelling.  Retrieved from http://www.educause.edu/ir/library/pdf/ELI7021.pdf  Egbert, J. (2009). Supporting learning with technology: Essentials of classroom practice. Upper  Saddle, NJ: Pearson.  Goodwin-Jones, R. (2003). Emerging technologies blogs and wikis: Environments for on-line  collaboration. *Language Learning & Technology, 7*(2), 12-16.  Halpern, D. F. (1998). Teaching critical thinking for transfer across domains. *American*  *Psychologists*, *53*(4), 449-455.  King, A. (1995). Designing the instructional process to enhance critical thinking across the curriculum.  *Teaching of Psychology*, *22*(1), 13-17.    Prensky, M. (2007). Simulation nation: The promise of virtual learning activities. *EduTopia*.  Retrieved from http://www.edutopia.org/simulation-nation |
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**ISTE Standards for Students:**

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| |  |  |  |  | | --- | --- | --- | --- | | **ISTE Standard** | **1-Rarely** | **2-Sometimes** | **3-Always** | | Creativity/Innovation  (1b) | Creates original works as a means of personal or group expression | Creates original works as a means of personal or group expression | Creates original works as a means of personal or group expression | | Creativity/Innovation  (1c) | Uses models and simulations to explore complex systems and issues | Uses models and simulations to explore complex systems and issues | Uses models and simulations to explore complex systems and issues | | Communication/Collaboration  (2a) | Interacts, collaborates, and publishes with peers, experts, or others employing a variety of digital environments and media | Interacts, collaborates, and publishes with peers, experts, or others employing a variety of digital environments and media | Interacts, collaborates, and publishes with peers, experts, or others employing a variety of digital environments and media | | Communication/Collaboration  (2d) | Contributes to project teams to produce original works or solve problems | Contributes to project teams to produce original works or solve problems | Contributes to project teams to produce original works or solve problems | | Research/Information  Fluency  (3b) | Locates, organizes, analyzes, evaluates, synthesizes, and ethically uses information from a variety of sources and media | Locates, organizes, analyzes, evaluates, synthesizes, and ethically uses information from a variety of sources and media | Locates, organizes, analyzes, evaluates, synthesizes, and ethically uses information from a variety of sources and media | | Research/Information  Fluency  (3d) | Processes data and reports results | Processes data and reports results | Processes data and reports results | | Critical Thinking/Problem Solving/Decision Making  (4b) | Plans and manages activities to develop a solution or complete a project | Plans and manages activities to develop a solution or complete a project | Plans and manages activities to develop a solution or complete a project | | Critical Thinking/Problem Solving/Decision Making  (4c) | Collects and analyzes data to identify solutions and/or make informed decisions | Collects and analyzes data to identify solutions and/or make informed decisions | Collects and analyzes data to identify solutions and/or make informed decisions | |

**ISTE Standards for Teachers:**

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| **ISTE Standard** | **1-Rarely** | **2-Sometimes** | **3-Always** |
| Facilitate/Inspire Student Learning and Creativity  (1a) | Promotes, supports, and models creative and innovative thinking and inventiveness | Promotes, supports, and models creative and innovative thinking and inventiveness | Promotes, supports, and models creative and innovative thinking and inventiveness |
| Facilitate/Inspire Student Learning and Creativity  (1b) | Engages students in exploring real-world issues and solving authentic problems using digital tools and resources | Engages students in exploring real-world issues and solving authentic problems using digital tools and resources | Engages students in exploring real-world issues and solving authentic problems using digital tools and resources |
| Facilitate/Inspire Student Learning and Creativity  (1c) | Promotes student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes | Promotes student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes | Promotes student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes |
| Facilitate/Inspire Student Learning and Creativity  (1d) | Models collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments | Models collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments | Models collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments |
| Design/Develop Digital-Age Learning Experiences/Assessments  (2a) | Design/adapt relevant learning experiences that incorporate digital tools/resources to promote student learning/creativity | Design/adapt relevant learning experiences that incorporate digital tools/resources to promote student learning/creativity | Design/adapt relevant learning experiences that incorporate digital tools/resources to promote student learning/creativity |
| Design/Develop Digital-Age Learning Experiences/Assessments  (2b) | Develop technology-enriched environments that enable students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress | Develop technology-enriched environments that enable students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress | Develop technology-enriched environments that enable students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress |
| Design/Develop Digital-Age Learning Experiences/Assessments  (2c) | Customizes and personalizes learning activities to address students’ diverse learning styles, working strategies, and abilities using digital tools/resources | Customizes and personalizes learning activities to address students’ diverse learning styles, working strategies, and abilities using digital tools/resources | Customizes and personalizes learning activities to address students’ diverse learning styles, working strategies, and abilities using digital tools/resources |
| Design/Develop Digital-Age Learning Experiences/Assessments  (2d) | Provides students with multiple and varied formative and summative assessments aligned with content and technology standards and uses resulting data to inform learning and teaching | Provides students with multiple and varied formative and summative assessments aligned with content and technology standards and uses resulting data to inform learning and teaching | Provides students with multiple and varied formative and summative assessments aligned with content and technology standards and uses resulting data to inform learning and teaching |
| Promote/Model Digital Citizenship and Responsibility  (4a) | Advocate, model and teach safe, legal, and ethical use of digital information/technology, including respect for copyright, intellectual property, and the appropriate documentation of sources | Advocate, model and teach safe, legal, and ethical use of digital information/technology, including respect for copyright, intellectual property, and the appropriate documentation of sources | Advocate, model and teach safe, legal, and ethical use of digital information/technology, including respect for copyright, intellectual property, and the appropriate documentation of sources |
| Promote/Model Digital Citizenship and Responsibility  (4b) | Addresses the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools/resources | Addresses the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools/resources | Addresses the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools/resources |
| Promote/Model Digital Citizenship and Responsibility  (4c) | Promotes/models digital etiquette and responsible social interactions related to the use of technology and information | Promotes/models digital etiquette and responsible social interactions related to the use of technology and information | Promotes/models digital etiquette and responsible social interactions related to the use of technology and information |

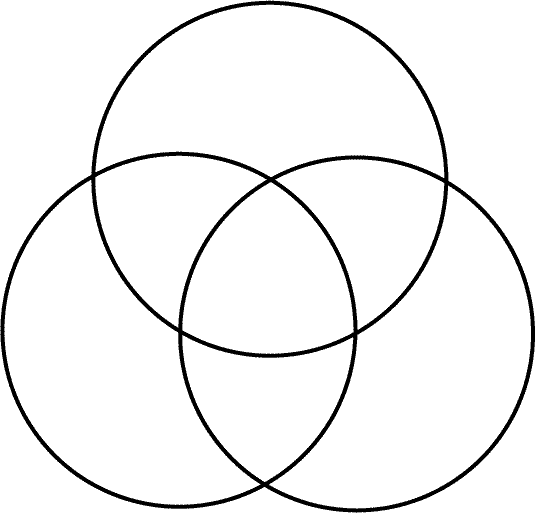
**SAMPLE**

Names \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Label each circle with the appropriate state of matter and write everything that you know about the three states of matter. Remember to write common characteristics in the appropriate

overlaps.

**SOLID**



No definite volume

No definite shape

Molecules spread apart a lot

Molecules move very quickly

Have mass

Have volume

Have molecules

Definite Shape

Definite Volume

Molecules are tightly packed

Molecules hardly move

**GAS**

**LIQUID**

**LESSON DIRECTIONS:**

(For today’s lesson, you will work in assigned groups of three with one computer per group.)

1. You will look at the following websites:

* <http://www.harcourtschool.com/activity/states_of_matter>
* <http://phet.colorado.edu/en/simulation/states-of-matter>
* <http://www.brainpopjr.com/science/matter/changingstatesofmatter>

2. During and/or after viewing the simulations and BrainPOP video, create 5 questions that can be answered from the websites.

* Use 5 of the following question frames to help you create your questions.
  + What is the difference between \_\_\_ and \_\_\_?
  + What would happen if \_\_\_?
  + Why is \_\_\_ important?
  + How are \_\_\_and \_\_\_ similar?
  + What do you think causes \_\_\_\_?
  + Explain why \_\_\_\_.

3. After your group creates the questions, the three of you must answer them completely on a separate sheet of paper. You may look back at the simulations and video, as needed.

4. After you have answered the questions, you will exchange the questions ONLY with another group.

* Group 1 will exchange with group 2.
* Group 3 will exchange with group 4.
* Group 5 will exchange with group 6.

5. Answer the new set of questions by creating a digital story using Photo Story 3.

* Use your imagination and be creative in expressing who you are and why you are asking questions and giving answers.
* Make sure you include the questions, in writing, on your digital story.
* Make sure your answers are complete. They can be written out or stated orally.
* You must include pictures/diagrams that correspond with your answers.
  + These can be hand-drawn and scanned into the computer or you may use Paint to create the pictures.

7. When you are finished creating your digital story, you must upload it to the class wiki (<http://mfilotas.pbworks.com>).

* To find your group’s page, click on your group number on the right hand side of the wiki.
* There are six groups total.

8. After uploading your digital story to the class wiki, each group will make comments to the group with which you exchanged questions.

* Since you answered the questions of the other group before exchanging, you know if the answers are correct.
* Remember, you can find each group on the right hand side of the wiki.

9. REMEMBER, EVERYONE’S IDEAS ARE IMPORTANT. PLEASE FIND SOMETHING POSITIVE BEFORE MAKING SUGGESTIONS FOR INCOMPLETE ANSWERS OR CORRECTIONS FOR INACCURATE INFORMATION. USE APPROPRIATE LANGUAGE, AND REMEMBER TO TREAT OTHERS THE WAY YOU WOULD WANT TO BE TREATED.