**Lesson Plan ~~Outline :~~Outline: 1st Lesson**

**Present the Inquiry after the students complete the lesson plan:**
Groundwater as Part of the Water ~~Cycle :~~Cycle: http://ecosystems.psu.edu/youth/sftrc/lesson-plans/water/9-12/groundwater

1. Discuss what the class found out in relation to the water cycle as it relates to ground water. Show reports of what is happening due to water shortages in California and other states experiencing reduced rainfall and ground water supplies.

2. **Anticipatory set**: Present a questionnaire about water and where we get ours as a school.

Everybody has the enough ground water to go around. True or False.

Farmers and gardeners already use the best growing practices. True or False.

It doesn't matter how we use our water supply now, there will always be more. Yes or No.

Collect the information on a chart and discuss the responses

3. Use guided questioning to get students to rephrase their responses in to questions so we as a class can explore ways to come up with positive solutions to the problem.

4. List questions on the whiteboard. Form at least 5 good questions.
Make for pieces of paper with the numbers 1 through 5 on them, one for each question.

5. Group students into four groups of three. Each group pulls a piece of paper with a number.

6. Each group chooses a way to present their answer to the question they got:
   1. Produce a working model.
   2. Make a plan and present it in a power point and Story board presentation for display.
   3. Produce news cast about their project; it must show understanding of the problem and clearly present their proposed resolution.

**1. Lesson Title:** Water will there always be enough? Are there better ways to use our water for raising our food?

**2. Lesson Author:** Carole Carlstrom

**3. Curriculum/Subject of Lesson:**
Science
Water conservation
Water conservation in agriculture/ rural and or urban growing practices.

**4. Grade Level of Lesson: 6th through 12**

**5. Lesson Duration: 45 min to one hour depending on class time allowed.**

**6. Lesson Materials/Resources:**

**Research findings from Science class.**
**Paper**
**Pencils**
**Computers or Chrome books.**
**Book: "What do you do with an Idea?" by Kobi Yamada**

**7. Lesson Overview/Rational:**
Students will research ways to use water more effectively to grow our food.
Students will show understanding by creating a plan to more effectively use water in our school garden by:
Creating an effective way of delivering water to the beds.
Creating a model of a recapture system for water used in irrigation.
Creating a plan to reduce water use in the garden.

**8. Essential Questions/Focusing Questions of Lesson**

I light of our changing water supplies in our country:
How can we use water wisely to grow our food?
If our water supply dwindles how can we make the best use of what we have in relation to growing our own food?
What methods would have to change and why?
Would we need to change what we grow and how we grow it?
How would you change our growing methods to make the best use of the water to grow the most nutrient dense food?
What would change about what is grown?
What would change about how it is grown?

**9. Goals:**

**Students will use multiple resources to investigate water usage and formulate a plan based on their research that can be shown in the form of :**

**1**. Plan for a garden design with detailed information on how it works and the projected results of the design based on sited research on outcomes of similar ideas.

2. Design a system of collecting water and using for growing food and then catching it and using it again.

3. Design a plan to use water from one system to feed a garden and water it, example from a large indoor fish tank in a green house to raise fish and then use the water congaing fish waste to water the crops growing in worm castings in a repurposed green house.

Students will present their design or model in the Science Fair.

**10. Objectives:**

Students will be able to prepare and deliver a persuasive, professional explanation of their design and its effectiveness to the Science fair judges.

**11. A.-E. Standards:**

ALA:

## 1. Inquire, think critically, and gain knowledge.

**1.1 Skills**

1.1.1Follow an inquiry based process in seeking knowledge in curricular subjects, and make the real world connection for using this process in own life.

1.1.3 Develop and refine a range of questions to frame the search for new understanding.

1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.

1.1.9 Collaborate with others to broaden and deepen understanding.

**1.2 Dispositions in Action**

1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts.

1.2.2 Demonstrate confidence and self- direction by making independent choices in the selection of resources and information.

1.2.3 Demonstrate creativity by using multiple resources and formats.

1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information.

1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success.

**1.3 Responsibilities**

1.3.1 Respect copyright/ intellectual property rights of creators and producers.

1.3.2 Seek divergent perspectives during information gathering and assessment.

1.3.3 Follow ethical and legal guidelines in gathering and using information.

1.3.4 Contribute to the exchange of ideas within the learning community.

1.3.5 Use information technology responsibly.

**1.4 Self-Assessment Strategies**

1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as
Necessary.
1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process.
1.4.3 Monitor gathered information, and assess for gaps or weaknesses.
1.4.4 Seek appropriate help when it is needed.

## 2 Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.

### 2.1 Skills

2.1.1 Continue an inquiry based research process by applying critical thinking skills (analysis,
synthesis, evaluation, organization) to information and knowledge in order to construct new
understandings, draw conclusions, and create new knowledge
2.1.2 Organize knowledge so that it is useful.
2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular
areas, real world situations, and further investigations.
2.1.4 Use technology and other information tools to analyze and organize information.
2.1.5 Collaborate with others to exchange ideas, develop new understandings, make decisions, and
solve problems.
2.1.6 Use the writing process, media and visual literacy, and technology skills to create products
that express new understandings.

### 2.2 Dispositions in Action

2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each
specific resource and by seeking additional resources when clear conclusions cannot be drawn.
2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test
them against the evidence.
2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence
leads to a decision or conclusion.
2.2.4 Demonstrate personal productivity by completing products to express learning
2. 2.3 Responsibilities 2.3.1 Connect understanding to the real world.
2.3.2 Consider diverse and global perspectives in drawing conclusions.
2.3.3 Use valid information and reasoned conclusions to make ethical decisions.

### 2.4 Self-Assessment Strategies

2.4.1 Determine how to act on information (accept, reject, modify).
2.4.2 Reflect on systematic process, and assess for completeness of investigation.
2.4.3 Recognize new knowledge and understanding.

2.4.4 Develop directions for future investigations.

## 3 Share knowledge and participate ethically and productively as members of our democratic society.

3.1 Skills 3.1.1 Conclude an inquiry based research process by sharing new understandings and reflecting on the learning.
3.1.2 Participate and collaborate as members of a social and intellectual network of learners.
3.1.3 Use writing and speaking skills to communicate new understandings effectively.
3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess.
3.1.5 Connect learning to community issues.
3.1.6 Use information and technology ethically and responsibly.
3.2 Dispositions in Action
3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations.
3.2.2 Show social responsibility by participating actively with others in learning situations and by contributing questions and ideas during group discussions.
3.2.3 Demonstrate teamwork by working productively with others.
3.3 Responsibilities
3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community.
3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints.
3.3.3 Use knowledge and information skills and dispositions to engage in public conversation and debate around issues of common concern.
3.3.4 Create products that apply to authentic, real-world contexts.
3.3.5 Contribute to the exchange of ideas within and beyond the learning community.
3.3.6 Use information and knowledge in the service of democratic values.
3.3.7 Respect the principles of intellectual freedom.
3.4 Self-Assessment Strategies
3.4.1 Assess the processes by which learning was achieved in order to revise strategies and learn more effectively in the future.
3.4.2 Assess the quality and effectiveness of the learning product.
3.4.3 Assess own ability to work with others in a group setting by evaluating varied roles, leadership, and demonstrations of respect for other viewpoints.

## 3 LEARNERS USE SKILLS, RESOURCES, & TOOLS TO: Pursue personal and aesthetic growth.

**4** 4.1 Skills
4.1.1 Read, view, and listen for pleasure and personal growth
4.1.2 Read widely and fluently to make connections with self, the world, and previous reading.
4.1.3 Respond to literature and creative expressions of ideas in various formats and genres.
4.1.4 Seek information for personal learning in a variety of formats and genres.
4.1.5 Connect ideas to own interests and previous knowledge and experience.
4.1.6 Organize personal knowledge in a way that can be called upon easily.
4.1.7 Use social networks and information tools to gather and share information.
4.1.8 Use creative and artistic formats to express personal learning.
4.2 Dispositions in Action

4.2.1 Display curiosity by pursuing interests through multiple resources.
4.2.2 Demonstrate motivation by seeking information to answer personal questions and interests, trying a variety of formats and genres, and displaying a willingness to go beyond academic requirements.
4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
4.2.4 Show an appreciation for literature by electing to read for pleasure and expressing an interest in various literary genres.
4.3 Responsibilities
4.3.1 Participate in the social exchange of ideas, both electronically and in person.
4.3.2 Recognize that resources are created for a variety of purposes. 4.3.3 Seek opportunities for pursuing personal and aesthetic growth.
4.3.4 Practice safe and ethical behaviors in personal electronic communication and interaction. 4.4 Self-Assessment Strategies
4.4.1 Identify own areas of interest.
4.4.2 Recognize the limits of own personal knowledge.
4.4.3 Recognize how to focus efforts in personal learning.
4.4.4 Interpret new information based on cultural and social context.
4.4.5 Develop personal criteria for gauging how efectively own ideas are expressed.
4.4.6 Evaluate own ability to select resources that are engaging and appropriate for personal interests and needs.

## Montana Standards

Information Literacy/Library Media Content Standard 1

To satisfy the requirements of Information Literacy/Library Media Content Standard 1, a student

must: identify the task and determine the resources needed.

Information Literacy/Library Media Content Standard 2

To satisfy the requirements of Information Literacy/Library Media Content Standard 2, a student

must: locate sources, use information, and present findings.

Information Literacy/Library Media Content Standard 3

To satisfy the requirements of Information Literacy/Library Media Content Standard 3, a student

must: evaluate the product and learning process.

Information Literacy/Library Media Content Standard 4

To satisfy the requirements of Information Literacy/Library Media Content Standard 4, a student

must: use information safely, ethically and legally.

**12. Technology Used:** Computers, Chrome books, Smart boards, Dragon Naturally speaking program on computers, Garden Tower as an example. Shop classroom tools

**13. A.-D. Collaboration:** (Science Teacher and Shop teacher (CT) Carole Carlstrom(LMS) Guided Inquiry Instructional Team members: Community garden representative; Student teams; Parent volunteers

**14. Anticipatory Set/Object Based Learning (Lead-In):** Read the book " What Do You Do With An Idea" by Kobi Yamada and Illustrated by Mae Brown.

**15. Process Model and Information and Technology Literacy Activities:** Select a process model appropriate for the lesson and grade level and list the lesson activates for each step.

**16. Step by Step activities and Process Models:**

**Opening**: Activate prior knowledge found in the lesson taught by the science teacher on ground water.
Have students answer the questions in the anticipatory set to get their minds working.
Show the example project the tower garden.

**Immerse:** We as a class will split into groups to explore the tower garden and make notes on their new ideas. Go out to the school garden to investigate how we can improve the use of our resources. Bring at least three I wonder statements back to the class.

**Explore:** ideas already in use via internet. Each team will bring back to the class at least three sites they will use as resources for information to the next class.

**Identify:** Each team **will identify at least two questions they will answer or find a process to support in their project.**

**Gather:** Each team will gather information on the internet, original research studies ect with at least three resources stated and correctly cited using APA format .

**Create:** Students will show their understanding by creating a new or repurposing an old method to create a solution the problems of using water for farming and returning it to the watershed as clean as it came out. They can use multiple methods of showing the end result; Power point, News cast, Blog format, demonstration, creating an working model, creating a screen cast to share with other gardeners.

**Share:** Results will be shared with the school at the annual science fair. and present their work to the class. Students will ask parents and judges for feedback on their project and record answers to bring back to class.

**Evaluate:** After the science fair come back together to discuss the feedback gathered from judges and community members at the fair. Students will submit a short reflection on how they would use the new information in the future. The can also include what input they would not use and why they deemed it not relevant.

## 17. Lesson Closure/Object Based Learning (Reflect Anticipatory Set

Go over the questions we discussed at the beginning of the lesson and ask for any additional feed back or clarification needed.

Read the book: What do you do with an idea.

## 18. Lesson Evaluation/Assignments/ Handouts/Teaching Materials:

Student Name: _____

| CATEGORY | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| **Ideas/Research Questions** | Researchers independently identify at least 4 reasonable, insightful, creative ideas/questions to pursue when doing the research. | Researchers independently identify at least 4 reasonable ideas/questions to pursue when doing the research. | Researchers identify, with some adult help, at least 4 reasonable ideas/questions to pursue when doing the research. | Researchers identify, with considerable adult help, 4 reasonable ideas/questions to pursue when doing the research. |
| **Group Timeline** | Group independently develops a reasonable, complete timeline describing when different parts of the work (e.g.,planning, research, first draft, final draft) will be done. All students in group can independently describe the high points of the timeline. | Group independently develops a timeline describing when most parts of the work will be done. All students in group can independently describe the high points of the timeline. | Group independently develops a timeline describing when most parts of the work will be done. Most students can independently describe the high points of the timeline. | Group needs adult help to develop a timeline AND/OR several students in the group cannot independently describe the high points of the timeline. |

| | | | | |
|---|---|---|---|---|
| **Delegation of Responsibility** | Each student in the group can clearly explain what information is needed by the group, what information s/he is responsible for locating, and when the information is needed. | Each student in the group can clearly explain what information s/he is responsible for locating. | Each student in the group can, with minimal prompting from peers, clearly explain what information s/he is responsible for locating. | One or more students in the group cannot clearly explain what information they are responsible for locating. |
| **Plan for Organizing Information** | Students have developed a clear plan for organizing the information as it is gathered and in the final research product. All students can independently explain the planned organization of the research findings. | Students have developed a clear plan for organizing the information in the final research product. All students can independently explain this plan. | Students have developed a clear plan for organizing the information as it is gathered. All students can independently explain most of this plan. | Students have no clear plan for organizing the information AND/OR students in the group cannot explain their organizational plan. |
| **Quality of Sources** | Researchers independently locate at least 4reliable, interesting information sources for EACH of their ideas or questions. | Researchers independently locate at least 23reliable information sources for EACH of their ideas or questions. | Researchers, with some adult help, locate at least 2 reliable information sources for EACH of their ideas or questions. | Researchers, with extensive adult help, locate at least 1 reliable information sources for EACH of their ideas or questions. |

## 19. Connection to Other Curricular Areas:

Connections to Science, Computer Science and Media production and Art depending on the product chosen by each team.

## 20. Adapted Learning:

1. Developmental Levels: Erikson, Maslow, Piaget, et
2. Multiple Intelligences: Gardner
3. Gender
4. Race/Culture/ethnicity Considerations:
5. Socioeconomics
6. Rural/urban
7. **Adaptations (For Students with Learning Disabilities) Dragon Naturally speaking on computers to allow for voice typing if necessary and transcription of notes. Each team can choose a note taker and provide an aid if necessary.**

**Demonstration of example product is accessible for students who are cannot bend over and wheel chair bound students.**

**8. Extensions (For Gifted Students):**

**1.To take the project to the next level large-scale production for small farms or commercial level production.**

**2. Modify it to be used in an inner-city setting where land and space are scarce.**

**3.Take the project to an international level and submit their plans to be published on Kitchen gardens international or submit to an Organic gardening magazine.**

## 21. Works Cited/ Resources:


Groundwater as Part of the Water ~~Cycle :~~Cycle: http://ecosystems.psu.edu/youth/sftrc/lesson-plans/water/9-12/groundwater

1 MILLION pounds of Food on 3 acres. 10,000 fish 500 yards compost https://www.youtube.com/watch?v=jV9CCxdkOng

| *Integrated Lesson Outline* | ✓ |
|---|---|
| **Student Name** | |
| 1. Lesson Title | |
| 2. About the author | |
| 3. Curriculum | |
| 4. Grade Level | |
| 5. Lesson Duration | |
| 6. Materials/Resources | |
| 7. Lesson Overview | |
| 8. Essential Questions | |
| 9. General Goal(s) | |
| 10. Student Learning Objectives | |
| 11.A. Standards National: NETS-S | |
| 11.B. Standards National: 21st century AASL | |
| 11.C. Standards State: MT Library/Information Literacy | |
| 11. D. Standards State: MT Technology | |
| 11. E. Standards State: Subject Content Standard | |
| 12. Technology Used | |
| 13. A. Collaboration: Classroom Teacher | |
| 13. B. Collaboration: School Librarian | |
| 13. C. Collaboration: Instructional Team | |
| 13. D. Student | |
| 14. Anticipatory Set/Object Based Learning (Lead-In) | |
| 15. Process Model and Information Literacy Activities | |
| 16. Step-by-Step Procedures/Activities CT/LMS & Student | |
| 17. Lesson Closure/Object Based Learning (Reflect Anticipatory Set) | |
| 18. A. Evaluation: Authentic Assessments | |
| 18. B. Evaluation: Assignments | |
| 18. C. Evaluation: Handouts/Teaching Materials | |
| 19. A. Curricular Areas: Subject/relation | |
| 19. B. Curricular Areas: Subject/relation | |
| 19. C. Curricular Areas: Subject/relation | |
| 20. A. Adapted Learning: Developmental Level | |
| 20. B. Adapted Learning: Multiple Intelligences | |
| 20. C. Adapted Learning: Gender | |
| 20. D. Adapted Learning: Socioeconomics | |
| 20. E. Adapted Learning: Rural/urban | |
| 20. F. Adapted Learning: Race/Culture/Ethnicity | |
| 20. G. Adapted Learning: **Adaptations** | |
| 20. H. Adapted Learning: **Extensions** | |
| 21. Works Cited/ Resources | |
| **Total** | |