Light it up for Mercy! **Mercy Watson to the Rescue** Lesson Plan Jacki Dull

Grade Level: 3rd
Time Allotment: Two 45 minute sessions

Learning Objective: The student will design and create a nightlight with a working light in a small group which will help Mercy fall asleep and not break her owner's bed using the design brief for direction and guidance.

Teacher Information:

1. Read Mercy Watson to the Rescue by Kate DiCamillo in a whole group setting. Discuss the main character and her personality. Discuss the problems and solutions in the story and sequence them. Ask which problem caused the other problems to occur (Mercy's fear of the dark). Tell them they will design and create a nightlight to help Mercy feel safe using what they know about her.

2. Group the children in 4's and review circuits.

3. Hand out design brief and read over together. Discuss materials that may be used. Discuss safe use of tools. Answer questions about materials and directions.

4. Show rubric to students and explain the various sections.

5. Hand out portfolios and have students brainstorm and fill them in.

6. Students will begin their designs. Remind them to refer to their portfolios and rubrics.

Tools: Scissors, hole punch, rulers, pencil, markers, crayons, colored pencils

Materials: 5 craft sticks, 5 brads, glue, 12 inches of masking tape, unlimited recycled materials such as cardboard tubes and plastic containers, 2 sheets of printer paper, 12 inches of yarn, 1 light bulb, battery, 2 wires, bulb holder, 1 paper clip, piece of cardstock

VA SOLS: Science

3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

a) observations are made and are repeated to ensure accuracy;
b) predictions are formulated using a variety of sources of information;
j) inferences are made and conclusions are drawn;
l) models are designed and built; and
m) current applications are used to reinforce science concepts.

4.3 The student will investigate and understand the characteristics of electricity. Key concepts include

a) conductors and insulators;
b) basic circuits;
c) static electricity;
d) the ability of electrical energy to be transformed into light and motion, and to produce heat;

English

3.1 The student will use effective communication skills in group activities.

a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said.
b) Ask and respond to questions from teachers and other group members.
c) Explain what has been learned.
d) Use language appropriate for context.
e) Increase listening and speaking vocabularies.

3.5 The student will read and demonstrate comprehension of fictional text and poetry.

d) Compare and contrast settings, characters, and events.
g) Draw conclusions about text.
h) Identify the problem and solution.

STL Standards:

Standard 8: Students will develop an understanding of the attributes of design.

3-5 Benchmarks

C. The design process is a purposeful method of planning practical solutions to problems.
D. Requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design.

Standard 9: Students will develop an understanding of engineering design.

3-5 Benchmarks

C. The engineering design process involves defining a problem, generating ideas, selecting a solution, testing the solution(s), making the item, evaluating it, and presenting the results.
D. When designing an object, it is important to be creative and consider all ideas.
E. Models are used to communicate and test design ideas and processes.

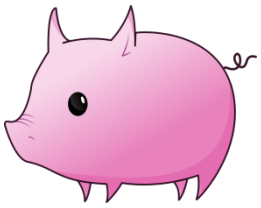
Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
3-5 Benchmarks
C. Troubleshooting is a way of finding out why something does not work so that it can be fixed.
D. Invention and innovation are creative ways to turn ideas into real things.
E. The process of experimentation, which is common in science, can also be used to solve technological problems.

Standard 11: Students will develop the abilities to apply the design process.
3-5 Benchmarks
D. Identify and collect information about everyday problems that can be solved by technology, and generate ideas and requirements of solving a problem.
E. The process of designing involves presenting some possible solutions in visual form and then selecting the best solutions from many.
F. Test and evaluate the solutions for the design process.
G. Improve the design solutions.

Standard 12: Students will develop the abilities to use and maintain technological products and systems.
3-5 Benchmarks
D. Follow step-by-step directions to assemble a product.
E. Select and safely use tools, products, and systems for specific tasks.
G. Use common symbols, such as numbers and words, to communicate key ideas.

Light it up for Mercy!

Design brief



Mercy Watson to the Rescue

Background: Poor Mercy! We know she is afraid of the dark, and her fear caused so many things to happen. It's a good thing we have learned so much about electricity and circuits to get us ready for 4th grade! We can help Mercy by creating something special just for her.

Challenge: You have the opportunity to design and create a working nightlight for Mercy! Your light must include a cover so it is not too bright and keeps her awake, but it must let light shine through so she will not be scared. The picture on the cover should be something Mercy likes. The nightlight needs a switch so Mr. and Mrs. Watson can turn it off, and it must stand on its own. Remember, Mercy and the Watsons are counting on you!

Criteria: Must light up and have an on/off switch that works,
Should have a cover with a picture that is neat and something Mercy likes,
Stand on its own.

Materials: 5 craft sticks, 5 brads, glue, 24 inches of masking tape, unlimited recycled materials such as cardboard tubes and plastic containers, 2 sheets of printer paper, 24 inches of yarn, 1 light bulb, battery, 2 wires, bulb holder, 1 paper clip, piece of cardstock

Tools: Scissors, hole punch, rulers, pencil, markers, crayons, colored pencils

Standards: Science 3.1 and 4.3, English 3.1 and 3.5, STL 8-12

Jacki Dull

Student Portfolio for **Light it up for Mercy!** Jacki Dull

Team Members: _____, _____,

_____, _____

1. What is the problem in your own words? _____

_____

2. Brainstorm and sketch 2 of your ideas in the boxes below.

3. Decide with your group which solution is best and create it.

4. Test your design and answer these questions

Did you use only the provided materials?	Yes	No
Does you night light come on with the switch?	Yes	No
Does it cut off with the switch?	Yes	No
Does it stand on its own?	Yes	No
Does it have a picture pleasing to Mercy?	Yes	No
Does light show through the cover?	Yes	No

5. Evaluate your solution and tell me if you would change any of it. Why or why not?

_____

_____

_____

_____

6. What do you predict would have happened in the story if Mercy would have had your light?

_____

_____

_____

_____

_____

_____

Rubric for **Light it up for Mercy!** Jacki Dull

Criteria Assessed	4-Meets criteria	3-Almost there! Meets most of criteria	2-Needs improvement Meets some of the criteria	1-Attempted but we need to talk
Restates problem				
Sketches 2 ideas				
Evaluated solution				
Wrote prediction				
Polite to team members				
Gave members a chance to express opinions				
Helped create and build design				
Must turn on/off with switch				
Must contain neat picture Mercy likes				
Must stand on own				
Must be able to explain design to class				
Share something that was difficult about design with class				
Share changes that were made with class				