



Liquids Solid and Gasses Oh My
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LESSON PLAN

Follow the Department Lesson Plan Format (found on Canvas) to create a fun and engaging lesson on any topic related to nutrition, health, or safety.

Unit Title: Liquids Solid and Gasses Oh My!

Grade Level: This lesson plan is intended for a second grade level of 25 students in the general education classroom.

Essential Question(s): How does a steam engine work? Did steam really die or have we just stopped using steam? What do we use now for energy?

Standards:

Objectives: By the end of this lesson students will be able to understand the general basis of how a steam engine works. Students will complete a worksheet filling in the different parts of the steam engine with 100% accuracy.

Materials and Equipment: Worksheet, pencils, Steam Engine Book,

PROCEDURE:

Introduction: “Good afternoon class, today we are going to be learning about gas and how gas was used in the past to power steam engines.” Prior to teaching this lesson the students have already learned about the state of solid and the state of a liquid. The teacher first explains to the students the state of matter known as gas. Gas is a sample of matter that fills to the shape of a container. If gas is not placed into a container, it will disappear into space. The teacher then ties gas into the importance that steam engines had on the Industrial Revolution in the 18th and 19th centuries. Before the teacher begins discussing the last topic, gas, the teacher first explains that a steam engine is simply a machine that burns coal to release heat energy. The teacher then gives the example of a giant kettle sitting on top of a coal fire. When the coal is hot enough it boils the water in the kettle and the water turns into steam. The teacher explains to the students that this is only the beginning of a process that is used to power the steam engine. The teacher then proceeds by explaining how the steam engine works in a series of four different parts. The teacher shows the students a diagram of the steam engine and explains to the students that the first part is where the coal burns and creates a very hot fire. The second part is a boiler full of water that the fire heats up to make steam. The third part is a cylinder and pistons. The piston works like a battery pump but it is much bigger. The steam from the boiler is piped into the cylinder causing the piston to move first one way and then the other. A machine is then attached to the piston that could be anything from a water pump to a factory machine...or even a giant steam locomotive running up and down railroad tracks. The teacher can also tell the students that this description is

a very simplified description of the steam engine. In reality there are hundreds or perhaps even thousands of parts in the smallest locomotive.

Anticipatory Set/Activating Strategies: After the teacher has gone over the different parts that are found in a steam engine. The teacher then engages the student by asking students the following questions. “Has anyone ever seen a steam engine before?” “Raise your hand if you have ever ridden on a train before?” The teacher allows the students to share their experiences with the rest of the class. The teacher then explains to the class that they are now going to label the different parts as a class. The teacher first reads the story “Thomas and Friends Steam Engine Stories” to the students. The teacher then has questions for the students after they finish the book. (Questions could include, Name one important part of the story? Recall one story you remember?) The teacher then works with the students to label the different parts of the engine as a class, after which the teacher labels each of the parts and has the students begin their worksheet activity.

Direct Instruction: Going over the different parts of the steam engine with the students. The teacher points to the different parts and calls on the students to come up to the front of the room and identify the different parts. As the students point to the individual parts the teacher describes more information about that part of the steam engine. As the teacher describes the different part of the steam engine, the teacher writes the sentence on the board.

Guided Practice: For the guided practice the teacher could have the students form different groups and go through the different parts of a steam engine. The teacher could break the students into different groups and then have the students identify the different parts of the steam engine. As the students are working at their different groups the teachers could have each group recall one fact about the specific part found on the steam engine.

Independent Practice: The teacher will direct the students to get out their science notebooks and the students will write the six parts in their science notebook provided at the beginning of the year. The students will title the page “States of Matter Steam Engine”, the teacher have the students copy the board with the teachers description of each of the parts. The teacher will then have the students complete a worksheet. On the worksheet the students will have to label the four different parts of the steam engine, the students will also color the different parts of the steam engine with realistic colors that would be seen on a steam engine. Finally the teacher will assess the students’ knowledge by having the students explain one of the six parts. Depending on the time constraint the teacher could assess the student with one or more part(s).

Closure/Summarizing Strategy:

Assessment: The teacher is able to assess the students by having the students explain one of the six parts as to check for understanding. After the students have finished their worksheet the student would raise their hand, and the teacher would check their work and then point to a part of

the steam engine. The student would then tell one fact that they remember about the steam engine. If the student would respond with the correct answer the teacher would praise the student, and draw a star at the top of the student's paper. If the student does not answer the question correctly the teacher will simply explain to the students the correct answer and still draw a star at the top of the student's paper.

Assignment (if any): The students will be directed to fill out a worksheet and fill in the six parts of a steam engine. The students will then be able to color their steam engine with colors they would use for a steam engine. Before handing the students the paper the teacher would tell the students they need to color the steam engine with colors they would find on a steam engine. The teacher would brainstorm with the students different colors they would see on a steam engine and what colors they would not see. After the teacher discusses with the students what colors to use the teacher could write these colors on the board to remind the student. Examples could include, gray, black, and silver. After the teacher goes over the colors the teacher could allow the students to begin the worksheet. As the students are working the teacher could tell the students that after this activity the teacher will come around and check the student's work. The teacher will point to a part of the steam engine and have the student explain that part it is. This would be the form of the students assessment by pointing to one part of the steam engine randomly the students will need to have a good understanding of each of the parts. For some of the parts the explanation may be a little more detailed, therefore if the student is struggling with answering the question, give the students guidance and prompting.

SPECIAL CONSIDERATIONS:

Early Finishers: For the students that finish early the teacher could have various books around the room that the students could look though and identify different parts of the steam engine. Once the student has found a different part that is not yet labeled the student could label the part. At the end of the day the teacher could check the student's paper and allow the student to share with the class their new part of the steam engine and what the part does for the steam engine. If the students seem interested in finding new parts the teacher could have the students also look up information about the particular part what it may have been used for. The student could then share this information with the class. If the student still has time feel free to allow the student to find more parts that they could later share with the class.

Remediation: For students that might be struggling with this activity the teacher could give the students a model of the finish product. Once the student has attempted to fill out the six different parts of the steam engine. The teacher could also make sure that the student is placed with a group of students that have a good understanding of the content and are willing to help that particular student. In addition when the teacher is going over the assessment portion the teacher could ask the student an easier question. Instead of asking the student a question regarding the piston or the machine attached to the piston the teacher could ask one of the first two parts regarding the fire where coal burns or the boiler full of water that heats to make steam.

As a future teacher we want to include the student as much as possible but find ways that will help the student feel successful and not frustrated.

Enrichment: For students that have an extreme interest for this activity the teacher could have the students complete the same worksheet with the rest of the class and explain a part of the steam engine. The teacher could also see if the student can label all six parts of the steam engine. Once the student has responded to all six parts of the steam engine the teacher could give the student a separate worksheet with four blanks and have the students try and figure out which part is on the new steam engine. By having the student fill out the four blanks on the new steam engine this will come as a challenge to the student, the student will be using their prior knowledge what they knew before about the train and connecting it to their new structured steam engine. Although this might be at first challenging for the student for a student that is gifted this would be a great challenge for them to complete. Please see attachment for enrichment worksheet and the answer Key.

Special Accommodations: For the students the teacher knows might need some extra assistance the teacher could provide a small word bank for the students to use. Each time they use a word they could then just cross it off on their word bank as they go. In addition when the teacher writes down the colors the students should use for their steam engine the teacher could simply go over to the student and make sure they have the correct materials needed. Finally the teacher could allow the student to use the small half sheet of paper to list all six parts and what they do for the steam engine. The teacher could allow the student to use this for their assessment to tell the teacher what the specific part does.

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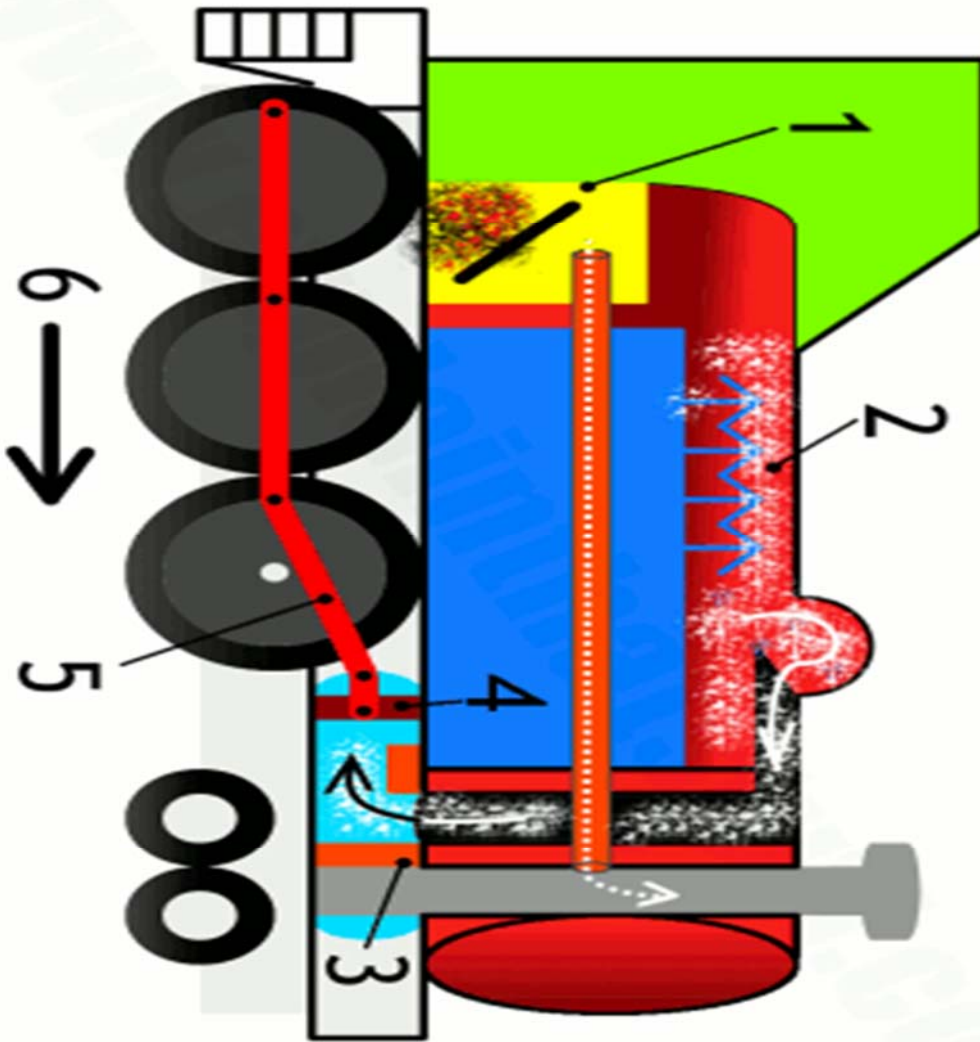
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Label the Parts of the Steam Engine!

Name: _____

Date: _____

Word Bank: (Special Accommodations)

Cylinder and Piston

Firebox where coal burns

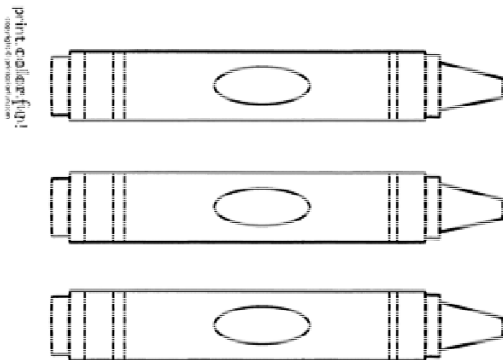
Machine attached to piston

Piston pushes crank and connecting rod

Boiler full of water

Crank and connecting rod

The colors needed for this activity are:



- Black
- Gray
- Silver

Enrichment:

