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Lesson Plan

Teacher Candidate: Bruno Galle	**Date:** March 23, 2024
Grade Level(s): 5	**Subject/Strand:** Science Strand C: Matter and Energy
Lesson Title: What's the Matter?	**Unit of Study:** Exploring and Understanding Matter

Lesson Overview: This is an introductory lesson to a unit on matter and introduces key concepts about matter. The goal of the lesson is to provide the foundational concepts that students will need to take a deeper dive into changes in states of matter and physical and chemical changes. In this lesson, students will build on what they learned in Grade 2 regarding solids and liquids, deepen their understanding of what matter is, the different forms of matter, and how to describe it. This will be accomplished through a variety of hands-on activities including observing and manipulating objects to discover different properties of and specific characteristics of matter.

The following lesson may be conducted over one or two periods depending on the available time.

PART 1: PREPARING THE LESSON

Ontario Curriculum Overall Expectations:	**Ontario Curriculum Specific Expectations:**
C2. Exploring and Understanding Concepts – Properties of and Changes in Matter	C2.1 describe matter as everything that has mass and occupies volume C2.2 identify the states of matter, and describe characteristics and properties of solids, liquids, and gases

Big Ideas/Enduring Understanding:

- Matter is made up of particles (which are often tiny and not visible to the human eye) and is anything that takes up space and has mass.
- We use the word "volume" to describe the property of taking up space and we use the word "mass" to describe the amount of matter an object contains.
- There are 3 different states of matter: solid, liquid, and gas.
- We can use different words, known as characteristics or properties, to describe matter. In addition to mass and volume, other properties can include things like what matter looks like, what colour it is, what it smells like, what shape it is, what it feels like, what temperature it is, how dense it is, and if it floats.

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Essential/Key Question(s):

The following key questions are the focus of the lesson, however, specific inquiry/probing questions are included, where relevant, throughout the lesson:

- What is matter and how do we know if something is made up of matter or not?
- What are some examples of matter and what are examples of things that are not considered matter? What makes them different?
- In what states can we find matter and how are they the same and different?
- How can we describe matter and what are the differences and similarities between the properties of the different states of matter?

Student Learning Goal(s):

1. We are learning what matter is and how to describe it.
2. We are learning to differentiate between the different states of matter, known as solids, liquids and/or gases.
3. We are learning to describe the different states of matter based on observable characteristics and properties.

Student Success Criteria:

1. We can define what matter is in our own words and provide examples of objects that would be considered matter and things that would not be considered matter.
2. We can identify 3 states of matter (solid, liquid, and gas), categorize everyday objects into those categories and explain why they fit into a specific category.
3. We can work with a team to carry out parts of the scientific inquiry process to investigate the properties of solids, liquids and gasses
4. We can describe some of the properties of solids, liquids and gasses and identify similarities and differences between the properties of states of matter.

Learning Skills and Work Habits:

The highlighted skills will be activated during this lesson:

- **Responsibility**
- **Organization**
- **Independent Work**
- **Collaboration**
- **Initiative**
- **Self-Regulation**

Collaboration: Students will be working in groups as they learn about the different types of matter and perform scientific inquiry regarding the properties of matter. To achieve the lesson success criteria, students will need to work effectively as a team. A component of assessment for learning will involve students' abilities to contribute to the success of the team, share ideas and work respectfully.

Organization: Students will need to know how to organize their thoughts, observations, and results in order to successfully complete investigations and scientific inquiry.

Independent work: While there will be opportunities for students to work together to share ideas, each student will be expected to generate independent products for assessment purposes (e.g. each student will complete their own copies of the worksheets in the Appendices) as I will want to assess if they understand the key concepts about matter and their level of participation during the lesson.

Necessary Prior Knowledge, Skills, and/or Previous Lesson:

This is meant to be an introductory lesson to a unit on matter. As a result, no specific prior knowledge on matter is required. However, students should be familiar with the basic concepts introduced in prior grades, as follows:

- In Grade 2, students should have been introduced to the properties of liquids and solids and changes of state between solids and liquids (see Grade 2 curriculum, Strand C2). However, students may need a refresher on these topics.
- Students would have also been introduced to the properties of light and sound Grade 4 (C2.3 and C2.7) and this knowledge/context may come up when discussing the various properties of matter.

New Vocabulary:

The following terms will be progressively introduced and used throughout the lesson. Vocabulary will be displayed on large anchor charts in the classroom. The definitions used below are direct references from scientific sources and have been included below *(see Resource section of this lesson plan (Items 1 and 2) for reference details).*

Matter – Everything around us is made of matter. Matter is anything that occupies space and has volume
Mass - The amount of matter in an object
Volume – The amount of space that matter takes up
Particle – Small parts that make up matter
Solid – A state of matter with a fixed shape and volume (takes up space). Solids are rigid and they cannot be squeezed or compressed easily.
Liquid – A state of matter with no fixed shape, but a fixed volume. This means that liquids take the shape of their container. The liquid particles are loosely connected so they cannot be squeezed or compressed easily, but they can flow when poured.
Gas – A state of matter with no fixed volume or shape. This means that gases take the shape of their container and can be squeezed or compressed easily. The gas particles are separated by great distances, so they can flow when being poured.

Inclusive Design Considerations:

- Lesson topics will be communicated in multiple ways to engage all students and to incorporate multiple intelligences, including anchor charts, hands-on inquiry. discussion, writing and/or drawing.
- Lesson topics will be scaffolded over a variety of activities.
- Students will be reminded that they are in a safe learning environment and will be encouraged to

share ideas freely and openly. Prior to the start of the lesson, teacher will remind students of the classroom expectations of being respectful, actively listening and celebrating contributions.

- While the teacher will encourage all students to participate, they will be given the option to "pass" when they feel uncomfortable during large group sharing portion of activities.
- The teacher will provide students with individual thinking time to reflect on ideas before asking them to share with the small groups or the class.
- The teacher will allow students to confer with a partner or their group to share their ideas first before asking for volunteers to share with the larger class so that everyone feels safe.

Learning Environment Considerations:

Materials

The following materials will be required:

Minds-On

- 1 copy of the graphic organizer for each student (see Appendix A)
- 6 baskets with the following items in each basket: horseshoe magnet, a medium sized rock, a bottle of water filled with water, an empty water bottle (not crumpled, filled with air), a wind-up alarm clock, a working flashlight, a pencil, a mirror, a deflated balloon, a leaf
- 1 kitchen egg timer
- 1 3-D model of an atom (or large image if not available)
- Chart paper and chart paper markers

Action

*(**Note:** if the class is too big, to avoid having too many students in one group, the teacher may want to double up and prepare two sets of materials for each station so 2 groups can complete the same station at the same time)*

- 1 copy of the graphic organizer for each student (see Appendix B)
- 1 copy of the self-reflection rubric for each student (see Appendix C)
- **Station 1 (Solids)**
  - 1 of each of the following: a golf ball, a ping-pong ball, squash ball, mini tennis ball and a mini ball-pit ball (all balls need to be the same or almost the same size)
- **Station 2 (Liquids)**
  - 3 clear, same sized glasses of water (each glass should contain 500mL of water), three different shaped containers of different volumes (one small Tupperware container, a mason jar, and a tall glass flask), and a clear measuring cup
- **Station 3 (Gasses)**
  - 5 normal balloons, 5 long balloons and a handheld balloon pump (the balloons need to be replaced/refreshed for each rotation so there is one of each type of balloon per person)

Consolidation

- Laptop, projector, speakers, and images displayed in the activity
- 1 Chromebook for each student. If there are not enough Chromebooks, provide 1 per group and designate a person who will navigate it for the group. If there are no Chromebooks, give

each group 1 mini white board, a white board marker and a white board eraser.

Classroom Arrangement/Necessary Preparation:

- Materials for minds-on and action activities (stations) will need to be prepped and ready before the start of the lesson.
- Desks should be arranged in groups to facilitate the stations.
- Students' worksheets need to be printed and photocopied before the lesson starts.
- Kahoot quiz will need to be prepared in advance.

Safety Concerns and Precautions (adapted and based on concepts from Resource item 3)

- As students will be rotating between stations, teacher should ensure that the classroom is clear of obstacles and students can move around freely.
- Identify any students with allergies and determine if the lesson involves any materials that they are allergic to (for examples, latex balloons). Teacher will find substitutes or eliminate those materials, as necessary.
- Review safety plan with students when conducting scientific inquiry with materials to explore properties of matter
    - Remind students that they must not eat or drink anything in the science lab, even if it is a food or drink item.
    - Remind students of the expectation that they should not be throwing or playing with any of the scientific inquiry items - these are for scientific inquiry only and should only be used as directed by the teacher.
    - Remind students to be cautious when handling any glass or breakable items (handle them with care).
    - Students should be reminded not to blow into anyone else's balloons for hygiene reasons.

Resources:

The following resources were consulted to clarify and reinforce teacher understanding of the scientific concepts covered during the lesson:

1. **Britannica Kids**: *matter:* https://kids.britannica.com/kids/article/matter/353444#:~:text=Anything%20that%20takes%20up%20space,mass%20than%20a%20beach%20ball.
2. **TVO Kids** – *Matter Matters* - https://tvolearn.com/pages/grade-5-science-and-technology-Ontario-Focus-learning-activity-2
3. **SAFETY IN ELEMENTARY SCIENCE AND TECHNOLOGY: A Reference Guide for Elementary School Educators**, https://cdn-5cb4e3b3f911cf0dc86f377b.closte.com/wp-content/uploads/2021/08/Safety-in-Elementary-Bd-Version-Updated.pdf
4. **Ontario Curriculum, Science and Technology (2022)** - https://www.dcp.edu.gov.on.ca/en/curriculum/science-technology/grades/grade-5/strands
5. All images used in this lesson plan were obtained under a license I have been granted from FreePik (https://www.freepik.com/). This license gives me the right to use these images. If reproducing this lesson using the same images, you will have to obtain a license or find other images.

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ASSESSMENT:

- **Assessment FOR Learning**
- **Assessment AS Learning**
- **Assessment OF Learning**

Specific Assessment Tool(s):

Given that this is meant to be an introductory lesson for a unit on matter, the focus will be on formative and/or diagnostic assessment. Summative assessment tools will be used later in the unit. Assessment will occur before, during, and after the lesson.

Teacher observations and anecdotal comments will be tracked in written form using assessment sheets that will be set up for each student.

Assessment For Learning:

- During the "Minds-On" activity, teacher will observe students' questions and responses as a diagnostic tool to gauge understanding of concepts relating to matter and their ability to think critically.
- Teacher will observe students for evidence that they are demonstrating the steps of scientific inquiry, their ability to follow instructions, ability to work co-operatively in groups, and understanding of key concepts relating to matter during group work and hands on activities. Teacher will make anecdotal notes on the student observation sheets.
- Teacher will review graphic organizers completed by students for evidence of demonstration of the steps of scientific inquiry, critical thinking skills, and understanding of key concepts relating to matter. Observations and anecdotal comments will be documented on student observations sheets.
- Teacher will review student responses to Kahoot game to assess student understanding of types of matter. Observations and comments will be documented on student observations sheets.
- Teacher will review student responses to consolidation questions as evidence of understanding of characteristics of matter.

Assessment As Learning:

- Students will be provided with success criteria checklist reflection sheets for the Action activity (see Appendix C) to allow them to reflect on what they have learned and where they can improve as it relates to the scientific inquiry process and working with others. Teacher will collect, review and provide descriptive feedback on the self-assessment sheets.

DIFFERENTIATED INSTRUCTION:

LESSON Accommodations and/or Modifications

Content

- Use images and graphics to reinforce and illustrate scientific concepts and to review and make it easier to understand language.
- Use repetition and scaffolding of content to ensure that learning is solidified.
- Ensure that any content is large (K-W-L chart and images on screen) and visible to all students, including any students that may have visual impairments.

Process

- Teacher, or a designated student helper, will scribe for students with literacy challenges or will allow students to use images or graphics to demonstrate understanding of ideas. Students may also use assistive technology to scribe (speech to text), if needed.
- Break-up lesson into smaller pieces and include movement breaks to avoid too much sitting.
- For hands-on inquiry, teacher will model/demo expectations and concepts first and discuss the materials before releasing groups to work independently.

Product

- Provide graphic organizers to help students who may have difficulty organizing ideas but also allow flexibility for students to record their product in a manner of their choosing or

ASSESSMENT Accommodations and/or Modifications

Content

- As described throughout the lesson plan, students will have the option to express themselves in multiple formats (orally, written, visually, or using assistive technology such as read and write software) and student assessment will focus on demonstration of the key understanding and scientific inquiry process instead of the form in which the concepts are captured.
- If any multi-lingual learners are present, they will have the option to express themselves in their first language if they feel more comfortable doing so.

Process

- Teacher will provide both written and oral feedback on student observations.
- If necessary, teacher will conference with students individually to provide more detailed feedback and to explain any teacher-initiated feedback in a way that the student can absorb it.

Product

- For student self assessment and reflection for the Action activity, teacher will offer the option to read the criteria aloud to students that may have difficulty reading. Teacher will also hold student conferences, where required, to allow students to explain their

add things that may not exist on the organizer.	graphic organizers and thought process and record observations noted relating to competency achievement.

Student IEP Related Differentiation:

This will vary based on the needs and abilities of the students in the classroom and if there are any IEPs. However, strategies for differentiation and UDL are included throughout the lesson plan and could be used to address a wide range of abilities or limitations that may be included on an IEP (e.g. assistive technology for scribing and reading, peer support, use of large, easy to read text, etc.).

PART 2: TEACHING THE LESSON (Lesson Design: 3-Part Lesson)

Estimated Total Time: 65 to 80 mins **Note: text in blue italics represent suggested student responses to inquiry questions*	**Instructional Strategy** **Differentiation** **Assessment**
MINDS-ON: **Estimated Time: 15-20 mins** Students will be separated into groups of 5-6. Each group will be given a basket that contains several different items. Without giving any other instruction, the groups will be told that they have 7 minutes to separate the items into categories. The groups can decide how many categories and which items belong to their categories. Students will be told that they will have to explain how they came up with the categories to organize the items. The items will include the following (*note: if any of these items are unavailable, they can be substituted as needed as long as there is a reasonable mix of items*). • A horseshoe shaped magnet • A medium sized rock • A 500 mL single use bottle filled with water • An empty 500 mL single use water bottle (not crumpled, filled with air) • A wind-up alarm clock • A working flashlight • A pencil • A mirror • A deflated balloon The teacher will set an egg timer for 7 minutes and let the students begin the activity. Once the egg timer rings, the teacher will go around the room and have one or more people from each table explain what categories they came up with and why. While this is happening, the teacher will scribe	**Instructional Strategy:** • Cooperative group work • Compare and contrast • Group inquiry • K-W-L chart **Differentiation:** • Teacher will ensure that kitchen egg timer makes a soft tone that is not jarring for students with noise sensitivity challenges • Timer will also be displayed visually on the screen • 3D model of particle will be displayed so that students can visualize what a particle looks like. Particle will be passed around so students can physically connect with it. • Teacher will ask probing questions as needed for students who are struggling extending their thinking. **Assessment:** • Teacher will take and record observations of student

responses on the board or a piece of chart paper.

After several responses, the teacher will consolidate the activity by telling the class that the purpose of this activity is to explore what matter is.

Teacher will explain that matter is in **everything** and point to all the items in the basket and explain that they are all matter, and matter is anything that has **mass**, which is how much matter an object contains, and occupies **volume**, the amount of space that the matter takes up. Matter can come in different states (*solid, liquid, gas*)

Teacher will hold up a 3D model of a group of particles and explain that matter is made of tiny particles some so small they we can't see them (**note:** the purpose of this illustration is only to show students what a particle might look like. The teacher will not introduce concepts of molecules or atoms, as this is a more advanced topic beyond grade level. However, students may bring up these terms).

Teacher will prompt student inquiry through the following questions, as needed based on responses:

- When you were doing the activity, did you consider how much the items weigh or how big they are to sort them? How did you do this? (this is to get students thinking about the concepts of **mass** and **volume**)
- Did you identify any items that you think had components of both matter and non-matter at the same time? Or were not matter at all? (if no responses, continue to drill down)
- If you turn on the flashlight, what do you see? Do you think this is matter? Why or why not? (*produces light, which is not matter because light does not take up space and does not have mass*)
- When you look at the water bottle, why do you think it's not crumpled? Do you think there is anything inside it? Do you think that is matter? (*air, yes air is matter because it takes up space and has mass*)

Tell students that we are going to start a large classroom K(What Do We Know) – W(What Do We Want to Know) - L(What Have We Learned) chart to keep track of our learning.

The teacher will ask students what we can add to the chart so far (*that matter has **mass** AND occupies **volume)*** in the 'learned' section**.** In pairs, students will come up with some questions that they may have about matter**.** Students will also be able to add anything that they already know about matter, such as the different states of matter.

thinking and thought process during group work. Teacher will also collect observation sheets from students and review and record observations on the groupings that students have come up with (Appendix A).

- Teacher will take and record observations of student thinking and thought process during larger class sharing or discussion.

Other Considerations:

- Teacher should take care not to reveal too much about the topic at this point, the goal of the strategy is to encourage students to think about the topic.

The teacher will tell students that we will be exploring the states and properties of matter further in this lesson.	
ACTION: **Estimated Time: 40-45 mins** The teacher will ask students to think back to the minds-on activity where they were categorizing items based on certain qualities. They will ask if anyone knows what the term for these words are (*properties or characteristics*) and explain that we can use them to describe matter. Teacher will add this term to the K-W-L chart and make a list of the types of properties. The teacher will explain that we will be looking closer at how we can describe matter. The teacher will then tell students that we are going to use scientific inquiry process (although students will not be engaged in the complete inquiry process) to try to answer questions about the properties of matter. Teacher will tell students that they will be working in groups and visiting stations. Each station has materials they can use to test their predictions. Students will record their thinking and results in the graphic organizer provided (see Appendix B). Students will work in groups, but each student will fill out their own organizer. Teacher will hold roving conferences while students are working at stations to observe them for assessment purposes and to help facilitate guided inquiry. Students will be provided with success criteria checklist reflection sheets (see Appendix C) to allow them to reflect on what they have learned/where they can improve as it relates to the scientific inquiry process and working with others to conduct investigations. Students will read and reflect on each question and circle 'yes' or 'no'. Teacher will collect, review and provide descriptive feedback on the self-assessment sheets. Following the gradual release of responsibility model, at this stage in the scientific inquiry process, the teacher will provide directed guidance to students, as needed.	**Instructional Strategy:** • Discovery/inquiry-based learning • Generating hypotheses/and predictions • Summarizing and taking notes • Graphic organizers • Roving teacher-group conferences • Guided inquiry **Differentiation:** • Teacher will walk around each station and provide roving guidance and support to each group, including asking probing questions to guide student thinking. • Graphic organizers will be provided to help focus student thinking and record their thoughts. For students with difficulty writing, they can draw pictures, or work with another group member to help them record their responses. Teacher can also hold a one-on-one conference with students who prefer to express their thought process orally. • Teacher will display a student friendly timer on the screen to help students keep on track and know how much time is left to complete each station.

Teacher will set up 3 stations as follows

Station 1 (Solids) **10 mins**

This station will contain a golf ball, a ping-pong ball, squash ball, mini tennis ball and a mini ball-pit ball (all balls should be approximately the same shape and size. Balls can be substituted as needed based on availability, but should be of different densities).

Students will work together to answer the following guided inquiry questions using the experiment worksheet.

- Observe the objects. What state of matter are they in? (*solid*)
- Do you think all of the balls have the same volume? How do you know this? (*because they are all the same size and take up the same amount of space*)
- Can you change the shape or bend the balls? (*no, solids are rigid and cannot easily change shape or size*)
- Can you compress or squeeze the balls? Try to compress them to test your hypothesis (*not very easily, solids cannot be easily compressed*)
- What other properties do you notice about the balls? (*possible answers can include properties describing the colour (white, green, etc.), texture (fuzzy, rough, etc.), odour (tennis ball has a scent of plastic) etc.*)

Stations 2 (Liquids) **10 mins**

There will be 3 clear, same sized glasses of water (each glass should contain 500mL of water), three different shaped containers (one small Tupperware container, a mason jar, and a tall glass flask) of different volumes, and a clear measuring cup.

Students will work together to answer the following guided inquiry questions using the experiment worksheet.

- Observe the water in its original containers. What state of matter is it in? (*liquid*)
- What do you think will happen to the shape of the water when you pour it into the different containers? Will it keep the same shape or change? Test your hypothesis (*it flows and takes the form of the container*)
- What do you think will happen to the volume of the liquid when you pour it in the different containers? Will it remain the same or change? Test your hypothesis (*it remains the same, even though the shape changes*)

Assessment:

- Teacher will walk around each station and observe groups. Teacher will record observations based on students' abilities to apply and understand the scientific inquiry process.

- Teacher will collect scientific inquiry graphic organisers after the activity and record observations on assessment sheets regarding student's abilities to perform scientific inquiry and critical thinking based on what is documented in the sheets.

Other Considerations:

- Groups should have at most 5-6 people. If there are too many students, teacher may want to set out two sets of materials at each station (with adequate distance so that groups are separated) so that two groups can explore the same station at the same time.

- Teacher should set timer so that groups explore each individual station for approximately 10-15 minutes. However, it is not advisable to rush this activity. If there is not enough time to complete all stations, this activity can continue during a future lesson. There should also be about 10-15 left for rich debrief/discussion of the results.

- Pour one cup of water into the plastic pouch and seal it. Do you think you will be able to compress it? Try to compress or squish it gently to test your hypothesis. Are you able to change to shape? (*there may be some compression, but liquids cannot easily be compressed*)
- What other properties do you notice? (*water is clear, no odor, flows easily*)

Station 3 (Gasses) **10 mins**

There will be 5 normal balloons, 5 long balloons and a handheld balloon pump.

Guided Inquiry Questions:

- Use your breath or the balloon pump to blow up the balloons and tie a knot at the end. What state is matter is inside the balloon? (*gas, air*)
- What do you notice about the shape of the balloon when you add air to the round balloon and the long balloon? (*the air takes on the shape of the balloon*)
- Do you think you can you compress or squeeze the balloons? Test your hypothesis (*yes, the air in the balloons can be easily compressed, however, if we press too hard the pressure may increase causing the balloon to pop*)
- What other properties about the air do you notice? (*possible answers can include no colour and no odor*)

Activity Wrap-Up **10 mins**

After groups have completed all stations, the teacher will put up the headings **solids, liquids and gases** on the board or wall and call on groups to write down at least one characteristic/property that they noticed based on the inquiry they conducted on a sticky note and place it in the appropriate category.

Working together with students, the teacher will summarize and compare the properties of solids liquids and gases according to the properties of shape (rigid, fixed, or not), volume (fixed or not), ability to be compressed and any other properties they can come up with.

The teacher should also encourage students to consider what new questions they have come up that they want to explore and record this on the K-W-L.

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CONSOLIDATION: Estimated Time: 10-15 mins

The teacher will prompt students to think back to the inquiry they have conducted and the properties of matter. Teacher will tell students that we will consolidate our learning by putting up images showing various states of matter and have students identify the state of matter and explain why they think it is that state based on the characteristics/properties (this will also serve as a diagnostic assessment to identify what students have learned about states of matter).

- Students will work in groups using the Kahoot application (or a similar digital tool). Teacher will hand out a Chromebook to each student. A quiz will have been previously set up with the following questions for each image: **Is this a solid, liquid, or gas?**
- Teacher will tell students that we are going to have a fun challenge to see how many states of matter students can identify correctly.

The images below will be displayed. Teacher will stop and debrief after each image and ask the following questions:

- Why do you think it's that state? What characteristics or properties are you basing it on?
- Do you think an object can be in more than one state at the same time? Explain your thinking.

State: *solid (cone), liquid (ice cream when melted)*

Instructional Strategy:

- Gamification – Kahoot
- Cooperative group work

Differentiation:

- Teacher will read Kahoot quiz options out loud for each question for any students that may have challenges reading or learn better from auditory cues.
- Students will work in groups and groupings will intentionally include students with a mix of academic and social strengths and improvement areas so they can support each other.

Assessment:

- Teacher will take and record observations of student thinking and thought process during game debrief.
- Teacher will review quiz results in Kahoot and use it as a diagnostic learning tool for the states of matter.

Other Considerations:

- If there are not enough Chromebooks, hand out only 1 per group.
- If no Chromebooks are available, hand out a mini whiteboard and markers to each group and have them write down and hold up their responses (designate one person per group to do this).

State: *solid*

State: *solid (grass, trees), liquid or gas (clouds)*

State: *liquid*

State: *solid (plastic inflatable), gas (air to pump up inflatables)*

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State: *Solid (kettle), liquid (water inside kettle), gas (steam)*

(Photo References: *see Resource section, item 5)*

Lesson Extension/Homework:

Teacher will ask students to look out for states of matter in their homes and communities and write down the properties they notice. They will record these in their science journals

Instructional Strategy:

- Reflection

Source: Tyndale University Lesson Planning Template adapted from the following:

- **McTighe, J. & Wiggins, G. (2004).** ***Understanding by Design: Professional Development Workbook.*** **ASCD.**
- **Hume, K. (2007).** ***Start Where They Are: Differentiating for Success with the Young Adolescent.*** **Pearson.**
- **Elementary Teachers' Federation of Ontario (ETFO). (2016).** ***Planning for Student Learning.*** **ETFO.**

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Appendix A:

Name: _____ Date: _____

Observation Sheet 

1. Examine each item in the basket
2. Sort the items into groupings or categories
3. Explain how you came up with those groupings/categories
4. If more writing space is needed, please use the back of this sheet

Category 1	**Category 2**
List the items	**List the items**
Why did you include these items here?	**Why did you include these items here?**
Category 3	**Category 4**
List the items	**List the items**
Why did you include these items here?	**Why did you include these items here?**

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Name: _____

Appendix B:

Investigating Properties of Matter

STATION 1	Write or draw your responses in the boxes below:
Observe the objects. What state of matter are they in?	
Do you think all of the balls have the same volume? How do you know?	
Can you change the shape or bend the balls?	
Can you compress or squeeze the balls? Try to compress them to test your hypothesis	
What other properties do you notice about the balls?	

STATION 2	Write or draw your responses in the boxes below:
Observe the water in its original containers. What state of matter is it in?	
What do you think will happen to the shape of the liquid when you pour it into the different containers? Test your hypothesis	
What do you think will happen to the volume of the water when you pour it in the different containers? Test your hypothesis	
Pour one cup of water into the plastic pouch and seal it. Do you think you will be able to compress it? Try to compress or squish it gently to test your hypothesis.	
What other properties about the water do you notice?	

STATION 3	Write or draw your responses in the boxes below:
Use your breath or the balloon pump to blow up each type of balloon and tie a knot at the end. What state of matter is inside the balloon?	
What do you notice about the shape of the balloon when you add air to the round balloon and the long balloon?	
Do you think you can you compress or squeeze the balloons? Test your hypothesis	
What other properties about the air do you notice?	

Appendix C:

Name: _____ Date: _____

Scientific Inquiry – Self Reflection Checklist

Criteria	Please circle one	Comments
Was I able to come up with a prediction (or hypothesis) to the questions before I did the experiment?	Yes/No	
Was my prediction specific?	Yes/No	
Was I able to come up with some ideas or a plan for how I will test my prediction?	Yes/No	
Did I record the results of my prediction?	Yes/No	
Did I think about other questions or "I wonder" statements I have?	Yes/No	
Did I actively contribute to my team?	Yes/No	
Did I respect the ideas and contributions of other team members?	Yes/No	
Did I stay focused and on task?	Yes/No	
Did I support and help other team members when needed?	Yes/No	