# Bachelor of Education (Elementary) &

# Bachelor of Education (Secondary) STEM

# Unit Plan Template

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| **Unit Title:** | Physical and Chemical Changes | **Number of Lessons** | 9 | **Time**  **(in weeks):** | 9 |
| Name: | Madison Schneider | Subject(s): | Science  Writing | Grade(s): | 2/3 |

Rationale

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| This unit is important because it teaches students the difference between physical and chemical changes in everyday life in fun and engaging ways. Students will spend time learning about physical and chemical changes separately and then have to opportunity to put them together and show their work. They will be able to take on a sense of wonder about the world. |

Overview:

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| In this unit, students will be able to explore science and English language Arts through the topic of physical and chemical changes. Students will first get a refresher lesson on matter before diving into physical changes. Students will have a lesson learning the material, an activity lesson connecting the material, and then an experiment/lab report lesson to explore their learning further. This will also then be done for chemical changes as well. Finally, students will put what they learned about physical and chemical changes together and compare and contrast them to showcase their learning in a way for me to assess them. |

CORE COMPETENCIES

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| Communication | Thinking | Personal & Social |
| Collaborating :  Students combine their efforts with those of others to effectively accomplish learning and tasks. As members of a group, they appreciate interdependence and cooperation, commit to needed roles and responsibilities, and are conscientious about contributing. They also negotiate respectfully and follow through on plans, strategies, and actions as they share resources, time, and spaces for collaborative projects. | * Critical thinking   Students learn to analyze and make judgments about a work, a position, a process, a performance, or another product or act. They reflect to consider purpose and perspectives, pinpoint evidence, use explicit or implicit criteria, make defensible judgments or assessments, and draw conclusions. Students have opportunities for analysis and critique through engagement in formal tasks, informal tasks, and ongoing activities.   * Creative thinking | * Positive personal and cultural identity * Personal awareness and responsibility * Social responsibility |

BIG IDEAS

(multiple subject areas for integrated unit)

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| Subject Name: Science | Subject Name: Language Arts (Writing) | Subject Name |
| [Materials can be changed through physical and chemical processes](https://curriculum.gov.bc.ca/curriculum/science/2/core). | Curiosity and wonder lead us to new discoveries about ourselves and the world around us. |  |

LEARNING STANDARDS

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| Curricular Competencies | Content |
| Demonstrate curiosity and a sense of wonder about the world | Chemical ways of changing materials |
| Observe objects and events in familiar contexts | Physical ways of changing materials |
| Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation | Sentence structure |

Prerequisite Concepts and Skills:

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| -Specific properties of materials allow us to use them in different ways  -Write a sentence |

Teacher Preparation Required:

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| Lesson # | Teacher Preparation Required (See Unit Plan Sample) |
| Lesson 1 | -Print 23 KWL worksheets (made on canva) |
| Lesson 2 | -Preview video <https://www.youtube.com/watch?v=JjPCoOQ0LlE>  -Have journals ready |
| Lesson 3 | -Preview book Siha Tooskin Knows the Best Medicine |
| Lesson 4 | -Print 23 lab reports teachers pay teachers page 70 physical changes document  -Gather material; paper, pencils, pipe cleaners, play dough, chalk |
| Lesson 5 | -Print, cut, assemble, and staple 23 physical changes booklets page 67 teachers pay teachers physical changes document |
| Lesson 6 | -Preview video <https://www.youtube.com/watch?v=JjPCoOQ0LlE> |
| Lesson 7 | -Gather paper for posters |
| Lesson 8 | -Print 23 lab reports Page 75 teachers pay teachers chemical changes document  -Gather glue, baking soda, food colouring, contact solution, bowl, spoon |
| Lesson 9 | -Print 23 compare and contrast worksheet page 78 chemical changes |
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Cross-Curricular Connections:

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| This unit largely incorporates English Language Arts in regards to writing because this is a great way to no only show student learning but also to make connections to the material. Students will have a lot of opportunities to use writing in their journals, worksheets, booklets, and other materials being used to document learning. Students will also get the change to draw on connections to the art curriculum when they draw their learning in worksheet, posters, and booklets. This unit also works with the core competencies of collaboration because students will use partners or groups to help further their learning. |

**Indigenous Connections / First Peoples Principles of Learning**:

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| * Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place). * Learning involves patience and time.   This unit is based on a connection between learning new material and making real life connections to hands-on activities and experiments. Like the first peoples principle, I also believe that learning is experiential and that students can make real meaning with the material when they are doing. Therefore, I tried to make a unit that also incorporates chances for real experiences. |

Universal Design for Learning (UDL):

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| Multiple means of representation: diagrams, charts, the volume or rate of speech, the speed and timing of videos, font on printed materials, worksheets, videos, books, games, activities, experiments, pre-teach vocabulary, connect and activate prior knowledge.  Multiple means of expression: options for showing learning, use sentence starters, worksheets, scaffold, use prompts, use prompts that embed “stop & think” before acting  Multiple means of engagement: provide learners with as much autonomy as possible by providing choices in the level of challenges, design, and timing of tasks, vary activities and source information so that they can be personalized and contextualized to learners’ lives, provide tasks that allow for active participation exploration and experiential, prompt learners on when and how to ask peers or teacher for help, use group work for connection and help students who struggle |

Differentiate Instruction (DI):

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| -Visual learners will be engaged throughout the unit by things like books, videos, worksheets, experiments, group work, stations  -Auditory learners will be engaged throughout the unit by videos, games, discussions, books  -Kinesthetic learners will be engaged throughout the unit by games, hands-on activities/experiments, worksheets  -Students that I know require extra help will be checked on regularly throughout work time  -Students that need to be reminded to stay on task will be reminded regularly  -Students that need assistance writing will be assisted by having the teacher write out the material on a separate paper and having the student copy it down in their own workbook  -Students that struggle with writing can complete the final worksheet verbally to me if needed |

Overview of Lessons:

Lesson 1

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| Name &Time (Minutes Allotted): | What is Matter? 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world  Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation |
| Learning Standards: Content | Chemical ways of changing materials  Physical ways of changing materials  Sentence structure |
| Instructional Objectives | Students will be able to demonstrate knowledge of particles that make up material. |
| Assessment: | Anecdotal recording |
| Teaching Strategies: | -Use key discussion point to activate schemas  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help  -Positive praise |
| Materials: | -22 KWL charts  -Chart paper |
| Lesson Activities: | |
| Introduction/Hook: | Start a discussion on states of matter. Activate schemas to see what students already know about matter and physical and chemical changes. Start a KWL chart with the students at the carpet. Teacher fills in the Know and Wonder columns as students tell the teacher what they think they already know about states of matter. Do the same for wonder. |
| Body: | Teacher makes sure students have the required knowledge on states of matter in the Know column by using prompts. Teacher might have to jog student’s memories by reminding them that there are 3 states of matter ect.  Students should have somewhat similar information too:  Matter is anything that takes up space. Everything is made of matter.  Physical properties are the characteristics of an object like weight colour or texture.  A solid is a form of matter that has a definite shape.  A liquid is a form of matter that takes the shape of its container and has volume.  A gas is a form of matter that moves freely around or takes the shape of its container.  Take time for students to look around the room and find things made of matter.  Teacher will then have students move to their desks and copy down the KWL chart on their own worksheet. |
| Closure: | Discuss what some of our wonders might be for physical and chemical changes. |

Lesson 2

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| Name &Time (Minutes Allotted): | Physical Changes, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world  Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation |
| Learning Standards: Content | Physical ways of changing materials  Sentence structure |
| Instructional Objectives | Students will be able to decipher what a physical change is and the factors that contribute to these changes by connecting the material through written work. |
| Assessment: | Anecdotal recording |
| Teaching Strategies: | -Use key discussion point to activate schemas  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help  -Brain break |
| Materials: | -Science journals  -Video: <https://www.youtube.com/watch?v=JjPCoOQ0LlE> |
| Lesson Activities: | |
| Introduction/Hook: | Have a quick discussion about previous lesson. Start discussion on physical change. What is a physical change to an object? When matter changes size, shape, or form but stays the same matter. |
| Body: | In their science journals, have students copy down the important vocabulary.  Matter: Anything that takes up space.  Physical change: When matter changes size, shape, or form but stays the same matter.  Play physical changes video. Stop video at 2:49  Have students write down how to know if it is a physical change.  Physical changes have a: new size, new colour, new shape, or can change back. |
| Closure: | As a closure, go over real examples of physical changes. Have students stand up and go to one side of the room if they think it is a physical change or the other side of the room if they do not think it is a physical change. Example: Ice melting, cutting paper, |

Lesson 3

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| Name &Time (Minutes Allotted): | Physical Changes of Medicine, 50 minutes |
| Learning Standards: Curricular Competencies | * Demonstrate curiosity and a sense of wonder about the world * Recognize First Peoples stories (including oral and written narratives), songs, and art, as ways to share knowledge |
| Learning Standards: Content | Physical ways of changing materials |
| Instructional Objectives | * Know that materials can be mixed or changed to be used in different ways * Physical changes can happen to use materials differently   Materials can be mixed, stirred, added to, heated, and/or boiled to change properties physically |
| Assessment: | * Verbal understanding/discussions * Anecdotal recording |
| Teaching Strategies: | -Read loudly and expressively  -Speak loudly  -Give clear instruction  -Keep transition time low  -Have materials ready |
| Materials: | Book: Siha Tooskin Knows the Best Medicine by Charlene Bearhead and Wilson Bearhead |
| Lesson Activities: | |
| Introduction/Hook: | -Start with a discussion hook- Who here has been hurt before? What do you do when your hurt?  -Discuss how medicine has been around for a long time and that Indigenous Peoples have made their own medicine through processes of physical changes. They have done this by finding certain plants to mix, grind, and boil to heal their people.  -Introduce the book  -Read Siha Tooskin Knows the Best Medicine |
| Body: | Explain that we as a class will go for a walk through the forest behind the school. During this nature walk, we will look for plants and things that we could possibly use for medicine. We will only be looking, not taking.  We will spend some time exploring and see what we can find. Students will be looking for at least two things that could be used. |
| Closure: | When we get back to the class, discuss the knowledge that goes along with medicine and mixing plants and that we cannot mix/pick plants without knowing what they are. Also cannot pick things without giving thanks. |

Lesson 4

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| Name &Time (Minutes Allotted): | Physical changes stations, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world  Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation |
| Learning Standards: Content | Physical ways of changing materials  Sentence structure |
| Instructional Objectives | Students will be able to connect their learning of physical changes through hands on activities and documenting their learning through a lab report. |
| Assessment: | Completion of lab report |
| Teaching Strategies: | -Positive praise  -Use key discussion point to activate schemas  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help  -Encourage creativity |
| Materials: | -22 lab reports, Page 70 physical changes  -Paper, pencil, pipe cleaner, chalk, play dough |
| Lesson Activities: | |
| Introduction/Hook: | Start discussion on matter. Matter can change the way things look without changing the matter. Reminder on that this is a physical change. Have students get into their table groups (the table groups that are assigned each morning). These table groups will be their groups for the activity. |
| Body: | In their groups, students will rotate through the stations to try out different physical changes. Each table will be a different station. Students will receive a lab report they will document the physical changes they create.  At each station, the students will create as many physical changes as possible to the material provided. They will then write down (record) what they did on their lab report. They will write down how they changed the way the material looked and at the very end they will write down how they know the matter hasn’t changed.  Students will get about 7 minutes per station.  The stations will be: paper, pencil, pipe cleaner, chalk, and play dough. Students can change the physical aspects of the materials however they wish (eg: cutting, folding, sharpening, mixing, building, ripping) |
| Closure: | After groups have gone through all the stations, students will have time to answer the final question of how they know that the matter has not changed.  Then students can share their findings with the class. |

Lesson 5

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| Name &Time (Minutes Allotted): | Physical changes Booklets, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world |
| Learning Standards: Content | Physical ways of changing materials |
| Instructional Objectives | Students will be able to showcase their knowledge on physical changes through documenting that knowledge in their own mini booklet |
| Assessment: | Completion and accuracy of booklet. |
| Teaching Strategies: | -Partners to help each other read  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help |
| Materials: | -22 physical changes mini books, Page 67 |
| Lesson Activities: | |
| Introduction/Hook: | Show students that we will be completing our own booklets on physical changes. Have students get into their AB reading partners. |
| Body: | In their AB reading partners, student will read the booklets together.  After students have read their book, they can start to colour in the pages. Pages are blank so that students can draw what helps them remember the material. Students should read the sentence and then draw a picture above to represent the words. |
| Closure: | Wrap up and clean up. Students can show me their books and read the sentences to me.  If students are not done their booklets, they can save them for our wrap up lesson to finish. |

Lesson 6

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| Name &Time (Minutes Allotted): | Chemical Changes, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world  Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation |
| Learning Standards: Content | Chemical ways of changing materials  Sentence structure |
| Instructional Objectives | Students will be able to decipher what a chemical change is through written work. |
| Assessment: | Anecdotal recording |
| Teaching Strategies: | Use key discussion point to activate schemas  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help  -Positive praise |
| Materials: | Science journals  Video: <https://www.youtube.com/watch?v=JjPCoOQ0LlE> |
| Lesson Activities: | |
| Introduction/Hook: | Have a recap discussion on what a physical change is. Introduce chemical changes. A chemical change is a change that can not be undone, that changes the matter. |
| Body: | In their journals, have students write down the important vocabulary.  Chemical changes: When matter changes into something new.  Play chemical changes video. Start video at 2:49  Have students write down how to spot a chemical change:  When light is released, temperature changes, gas is released, new smells, sound, or colour change.  Go over examples if needed: (bubbles: mixing baking soda and vinegar, light: burning wood, colour: frying an egg, temperature baking cookies, sound: fireworks, or order: milk souring). |
| Closure: | Have students talk about what examples of chemical changes might be. What are things that turn into new things? Go over a list of examples of chemical changes:  Frying an egg, baking cookies, burning wood, making s’mores, milk going sour. |

Lesson 7

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| Name &Time (Minutes Allotted): | Chemical Change Posters, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world |
| Learning Standards: Content | Chemical ways of changing materials |
| Instructional Objectives | Students will be able to show what they learned about how to identify a chemical change and showcase that learning in a way to show their learning to the rest of the class. |
| Assessment: | Group work skills and completion of poster with accuracy |
| Teaching Strategies: | -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help  -Give clear instructions |
| Materials: | 6 poster papers  Colouring material |
| Lesson Activities: | |
| Introduction/Hook: | Go over the six ways to spot a chemical change: bubbles, heat, light, odor, sound, colour.  Put students into groups based on their bin rows. Row 1 will be bubbles, 2 will be heat, and so on. |
| Body: | In their groups, students will create a poster to represent their way to know a chemical change. There will be six groups, each group will show one way. Students can show their way on the poster in any way. They may want to show an example of change like fruit changing colour ect.  Or they may want to show their knowledge through multiple examples, or through a picture and some describing words. |
| Closure: | Once the posters are finished, groups will share their posters with the class. |

Lesson 8

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| Name &Time (Minutes Allotted): | Chemical Change Experiment, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world  Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation |
| Learning Standards: Content | Chemical ways of changing materials  Sentence structure |
| Instructional Objectives | Students will be able to use their skills and knowledge on chemical changes by completing a hands-on experiment and documenting their work in a lab report. |
| Assessment: | Completion of lab report |
| Teaching Strategies: | -Use key discussion point to activate schemas  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help  -Have student helpers |
| Materials: | -23 lab reports Page 75  -glue, baking soda, food colouring, contact solution, bowl, spoon |
| Lesson Activities: | |
| Introduction/Hook: | Explain that today we will be making our very own chemical change.  Today we will be making slime!  Hand out the lab report worksheet |
| Body: | Pour glue into a bowl.  Have students talk about the properties of glue: what does it look like, what does it feel like, what colour is it, what does it smell like)  Have students draw what the glue looks like and write down some of the properties on their lab report.  Add in food colour. Discuss what we just did to the glue.  Talk about the properties of baking soda and contact solution.  Add in some baking soda and contact solution. Have students mix the mixture (drawing names from the popsicle sticks).  Have students play with the slime.  Have students talk about how we changed the glue, and what the properties of the slime are. |
| Closure: | Clean up  Have students finish their lab report by drawing what the slime looks like and writing down its properties.  Discuss our findings. |

Lesson 9

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| Name &Time (Minutes Allotted): | Physical and Chemical Changes, 50 minutes |
| Learning Standards: Curricular Competencies | Demonstrate curiosity and a sense of wonder about the world  Communicate using sentences and most conventions of Canadian spelling, grammar, and punctuation |
| Learning Standards: Content | Chemical ways of changing materials  Physical ways of changing materials  Sentence structure |
| Instructional Objectives | Students will be able to decipher between a physical and chemical change and compare and contrast them in a Venn diagram worksheet. |
| Assessment: | Students will be largely assessed for this unit by the worksheet they hand in in this lesson. I want to see that they know what a physical and chemical change are, how they are different and examples.  I will also be looking over the KWL chart and any other material they handed in to me.  A checklist will be completed for each student that they can show me that they learned about physical and chemical changes. |
| Teaching Strategies: | -Use key discussion point to activate schemas  -Have materials ready  -Circulate room to help students  -Circle back on students that I know need extra help |
| Materials: | -23 compare and contrast worksheet page 78 chemical changes  -Previous KWL chart |
| Lesson Activities: | |
| Introduction/Hook: | Start discussion on chemical and physical changes, recapping the important parts. Talk about the differences and similarities. |
| Body: | Have students complete the compare and contrast worksheet for evaluation. Students will have to write down what they know of physical and chemical changes by comparing and contrasting them and then provide an example for each.  After students hand in their worksheet, students will pull out their KWL chart from the first lesson and fill in the learn column. |
| Closure: | A final discussion on what we learned (especially asking students that perhaps didn’t get to the KWL chart or who struggle with writing). |

Resources:

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| -Canva  -Teachers pay teachers chemical changes <file:///C:/Users/max19/Downloads/ChemicalChangesActivitiesandInteractiveNotebookMaterials-1.pdf>  -Teachers pay teachers physical changes  <file:///C:/Users/max19/Downloads/2ndGradeSciencePhysicalChangesPropertiesofMatterInteractiveNotebook-1.pdf>  -Physical and chemical changes video: <https://www.youtube.com/watch?v=JjPCoOQ0LlE> |

Extensions to Unit:

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| If students finish any lesson early, there will be different physical and chemical changes worksheets available to complete (wordsearch, draw an arrow to the definition, cut and paste, ect)  -To extend this unit, if I had more time, I would like to also do a mini booklet on chemical changes so that students had one of each to keep. I would also like to spend some time outside learning about chemical changes.  There are also many great experiments that I would have liked to be included if we had more time, such as the scrambled eggs experiment for physical changes and the s’mores experiment for chemical changes. |

Reflections and Revisions

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