**Assessment Ideas**

**Creating Learning Goals and Success Criteria with the Ontario Science Curriculum**

Creating your assessment tool, learning goals, and success criteria from the top down ensures validity and reliability. Here are some examples with the grade 5 curriculum.

**1. Start with the MOE document and Overall Expectations:**





**2. Unpack Knowledge and Skills:**

Looking at the specific expectations, what are the learning concepts, principles, and information, application to a context:

|  |  |
| --- | --- |
| **Overall Expectation** | **UNPACKED knowledge and skills** |
| demonstrate an understanding of the properties of matter, changes of state, and physical and chemical change. | * matter is all around us - anything that has mass and takes space
* matter is made up of particles called molecules
* 3 different states are solid, liquids, and gas
	+ Solids have definite volume and hold their shape
	+ Liquids have definite volume and take the shape of the container they are in
	+ Gases have no definite volume and take the shape of the container
* states can change and we can see it happen all around us
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**3. Turn the list of Knowledge and Skills into Learning Goals:**

What do YOU want students to know or be able to do? (e.g., We are learning to …)

|  |  |
| --- | --- |
| **UNPACKED knowledge and skills** | **Learning Goals** |
| * matter is all around us - anything that has mass and takes space
* matter is made up of particles called molecules
* molecules of matter can be in different states
* 3 different states are solid, liquids, and gas
	+ Solids have definite volume and hold their shape
	+ Liquids have definite volume and take the shape of the container they are in
	+ Gases have no definite volume and take the shape of the container
* states can change and we can see it happen all around us
* etc...
 | We are learning...* That the world around us is composed of matter, which is composed of tiny particles that have different states
* Solid, liquid, and gas are 3 states of matter
* We can change the state of matter by changing the temperature
* There are processes that occur in nature and at home that demonstrate these changes
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**4. Turn the Learning Goals into Success Criteria:**

* Written from their perspectives
* How do students know they are successful?

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| --- | --- |
| **Learning Goals** | **Success Criteria** |
| We are learning...* That the world around us is composed of matter, which is composed of tiny particles that have different states
* Solid, liquid, and gas are 3 states of matter
* We can change the state of matter by changing the temperature
* There are processes that occur in nature and at home that demonstrate these changes
 | I am able to...* represent water as tiny particles
* create a program that animates water as solid, liquid, and gas
* show a relationship between the temperature and state of matter
* show that a fridge will freeze water into a solid, that I can obtain liquid water from a room faucet , and that boiling water in a kettle changes it to a gas
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**Success criteria are essential for two things:**

1. The giving of descriptive feedback - Assessment FOR and AS learning!
2. The development of an assessment tool
* The Achievement Chart is NOT an “Assessment Tool”
	+ It’s not specific enough
* The Achievement Chart IS a framework for assessment



**NOT an
“Assessment Tool”**

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“Assessment Tool”**

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“Assessment Tool”**

 **“Assessment Tool”**

**NOT an
“Assessment Tool”**

**NOT**

**5. Match a standard, Learning Goal or Success Criteria to an** [**achievement chart**](https://drive.google.com/open?id=0B3D8B3J5VgxqMU1ZRkwzSGMzeTg) **category:**

* + Ensure each criterion is:
		- derived from standards (valid)
		- understood by student (& teacher)
		- observable
		- distinct from each other
		- able to completely describe the whole learning outcomes that the task is intended to access
		- able to be described at different levels

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| **Achievement Chart Categories** |
| KnowledgeSee the world around us composed of matter, which is composed of tiny particles that have different states |
| CommunicationSolid, liquid, and gas are three states of matter |
| ThinkingNone |
| ApplicationWe can change the state of matter by changing the temperature |

**5. Create Performance-Level Descriptors:**

What does student work look like at each level of quality from high to low in this criterion?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Level 4 | Level 3 | Level 2 | Level 1 |
| ApplicationWe can change the state of matter by changing the temperature | Each state of matter is accurately represented and gives a clear, detailed, and informative view of what is happening in relation to the temperature | Each state of matter accurately represented in relation to the temperature | Some states of matter do not show what happens in relation to temperature | The representation does not help show what happens to matter in relation to temperature |

* Start with Level 3 (Provincial Standard) and move up and down
* Exemplars for different levels - does not have to be task specific
* Descriptors that are too specific constrain creativity and metacognitive development
* Be careful of rubrics disguised as directions (too specific) or checklists (either DONE or NOT DONE)
* Be careful of including quantity to describe different levels - quantity > quality
* Evaluative terms should not be used (e.g., excellent, good, fair, and poor)
* Describe student performance in terms that allow for many different paths to success

**Example Rubric for Robotics Task - Grade 4 - Pulleys and Gears**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | **Level 1** | **Level 2** | **Level 3** | **Level 4** | **Comments** |
| **Knowledge and Understanding** | Demonstrates a limited understanding of how a pulley and/or gear system allows a small input force to generate a large output force in the context of the robotics task | Demonstrates some understanding of how a pulley and/ or gear system allows a small input force to generate a large output force in the context of the robotics task | Demonstrates considerable understanding of how a pulley and/ or gear system allows a small input force to generate a large output force in the context of the robotics task | Demonstrates thorough understanding of how a pulley and/ or gear system allows a small input force to generate a large output force in the context of the robotics task |  |
| **Application** | Applies at least four of the robotics skills to solve the problem with limited effectiveness | Applies at least four of the robotics skills to solve the problem with some effectiveness | Applies at least four of the robotics skills to solve the problem with considerable effectiveness | Applies at least four of the robotics skills to solve the problem with a high degree of effectiveness |  |
| Chooses a solution that makes connections between what you know about robotics, science, and the challenge with limited effectiveness | Chooses a solution that makes connections between what you know about robotics, science, and the challenge with some effectiveness | Chooses a solution that makes connections between what you know about robotics, science, and the challenge with considerable effectiveness | Chooses a solution that makes connections between what you know about robotics, science, and the challenge with a high degree of effectiveness |  |
| Creates a flow chart that proposes a course of practical action of limited effectiveness  | Creates a flow chart that proposes a course of practical action of some effectiveness | Creates a flow chart that proposes a course of practical action of considerable effectiveness | Creates a flow chart that proposes a course of practical action of a high degree of effectiveness |  |
| **Thinking** | Uses critical / creative thinking processes to program the robot to complete the chosen plan and accomplish the task, with the parameters (time and space), with limited effectiveness | Uses critical / creative thinking processes to program the robot to complete the chosen plan and accomplish the task, with the parameters (time and space), with some effectiveness | Uses critical / creative thinking processes to program the robot to complete the chosen plan and accomplish the task, with the parameters (time and space), with considerable effectiveness | Uses critical / creative thinking processes to program the robot to complete the chosen plan and accomplish the task, with the parameters (time and space), with a high degree of effectiveness |  |
| Uses processing skills and strategies to test, troubleshoot, and revise the plan, using the equipment respectfully, with limited effectiveness | Uses processing skills and strategies to test, troubleshoot, and revise the plan, using the equipment respectfully, with some effectiveness | Uses processing skills and strategies to test, troubleshoot, and revise the plan, using the equipment respectfully, with considerable effectiveness | Uses processing skills and strategies to test, troubleshoot, and revise the plan, using the equipment respectfully, with a high degree of effectiveness |  |
| **Communication** | Expresses ideas and information, explaining why and how your solution works, using appropriate scientific and technological terminology with limited effectiveness  | Expresses ideas and information, explaining why and how your solution works, using appropriate scientific and technological terminology with some effectiveness  | Expresses ideas and information, explaining why and how your solution works, using appropriate scientific and technological terminology with considerable effectiveness  | Expresses ideas and information, explaining why and how your solution works, using appropriate scientific and technological terminology with a high degree of effectiveness  |  |

**Resources:**

Wayne Loo and Andrew Schmidt - Presentation on Coding in the Elementary Grades, TDSB, 2014. Used with permission.

**Assessment Checklist and Rubric Suggestions**

**Learning Goals:**

**Specific Expectations:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consistently** | **With prompts** | **Not yet** |
| The student identifies the desired outcome for their design  |  |  |  |
| The student identifies the related QUALITATIVE observations to that outcome |  |  |  |
| The student identifies the related QUANTITATIVE observations to that outcome |  |  |  |
| The student uses the vocabularyappropriately |  |  |  |
| The technological-design process shows signs that new knowledge was used to improve on the design (especially enabling qualitative and quantitative observations) |  |  |  |

**Assessment Checklist**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consistently** | **With prompts** | **Not yet** |
| The student can identify which materials are better (taking into consideration all criteria for success) |  |  |  |
| The student has reworked the design or confirmed their choices following the experimental results  |  |  |  |
| The student follows safety protocols at all times |  |  |  |

**OVERALL SUGGESTIONS FOR THE UNIT**

General Criteria to look for in Assessment Pieces:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consistently** | **With prompts** | **Not yet** |
| Can the student use the vocabularyappropriately? |  |  |  |
| Does the technological-design process show signs that new knowledge was used to improve on the design? |  |  |  |
| Can the student justify choices in their design for criteria success?  |  |  |  |

**Self-evaluation for design and re-design**

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| **Self-evaluation for design and re-design**(5= My best effort; 3 = Medium; 1 = Poor effort) |
| Were my sketches clear enough for others to understand? | 5 4 3 2 1 |
| Did I include written suggestions on my rough sketch? | 5 4 3 2 1 |
| Did my product do what I designed it to do? Did my solar oven meet my self-selected criteria? | 5 4 3 2 1 |
| If I worked with others, how well did I cooperate? | 5 4 3 2 1 |
| If I worked with others, how would I rate my contribution to the product? | 5 4 3 2 1 |

**Science and Technology Performance Task (From the Halton District School Board)**

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| --- | --- |
| **CRITERIA** | **Performance Indicators** |
| **Level 1** | **Level 2** | **Level 3** | **Level 4** |
| **Design Process** plan | Develops a plan with limited clarity and a few steps | Develops a workable plan with some clarity and some steps | Develops a clear workable plan, including steps, in a logical sequence | Develops a workable plan and modifies the plan as necessary |
| **Design Process** use of materials | Uses tools, equipment, and materials with limited regard to safety | Uses tools, equipment, and materials with some regard to safety | Uses tools, equipment, and materials safely | Uses tools, equipment, and materials safely and appropriately |
| **Design Process** use of design process | Demonstrates little use of the design process (plan, build, test, evaluate, communicate) | Demonstrates some use of the design process (plan, build, test, evaluate, communicate) | Uses the design process (plan, build, test, evaluate, communicate) | Uses the design process (plan, build, test, evaluate, communicate) effectively |
| **Model**translate plan to model | Translates design plans into a working model, with assistance | Translates design plans into a working model with limited assistance | Successfully translates design plan into a working model based on criteria required | Successfully translates design plan into a working model based on criteria required |
| **Model**model performs intended task | Creates model that performs intended function in a limited manner | Creates model with some evidence of intended function | Creates model that functions successfully according to specifications | Creates model that functions beyond expectations |
| **Communication** terminology | Uses little appropriate terminology for grade level | Uses some appropriate terminology for grade level | Uses most appropriate terminology for grade level | Uses all appropriate terminology for grade level |
| **Communication** clarity | Report lacks clarity | Communicates with some clarity | Communicates clearly, precisely (e.g., oral or written) through all stages of task | Communicates clearly, precisely, and insightfully |
| **Communication** presentation skills / style | Limited awareness of importance of style to suit purpose | Uses a presentation style that is somewhat appropriate to purpose and audience | Chooses a presentation style that is appropriate to purpose and audience | Skillfully chooses a presentation style that maximizes the impact for purpose and audience |
| **Communication** of basic concepts | Communicates understanding of few of the basic concepts | Communicates understanding of some of the basic concepts | Communicates understanding of most of the basic concepts (for grade level) e.g., oral or written | Communicates understanding of all of the basic concepts |
| **Learning Log** reflection for purpose | Makes limited reflection | Reflects on results but makes few changes | Reflects on results in order to make necessary changes and evaluate information gathered | Uses sophisticated reflection to record results.  Makes changes and evaluates information gathered |
| **Learning Log** goals / time lines | Sets a few goals and describes few of the steps needed to achieve goals | Sets some goals and describes some of the steps needed to achieve goals | Sets clear goals and describes each step needed to achieve goals | Sets clear goals and describes each step needed to achieve goals and adjusts as necessary |
| **Learning Log** resources | Selects, records, and uses resources with limited appropriateness | Selects, records, and uses somewhat appropriate resources | Selects, records, and uses appropriate resources | Selects, records, and integrates appropriate resources |
| **Group Work** contribution to group goal | Has limited success working toward group goals | Demonstrates some commitment to the group goals; carries out specific roles with some success | Demonstrates commitment to the group goals and carries out assigned roles | Actively identifies group goals and fulfills a variety of roles in group |

**Sample Design Rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Categories↓** | **Needs Improvement****1** | **Fair****(Novice)****2** | **Good****3** | **Excellent****4** |
| **Innovative Design****(program and structure in unison)** | Design is substandard; not able to achieve the challenge; motor movement is inaccurate; misuse of sensors | Design is standard with no surprises or innovation; achieves the challenge at least some of the time; standard use of sensors | Some unique features that make the design better than average; achieves the challenge all or almost all of the time; thoughtful use of sensors | The design is surprisingly unique, making it superior to others; achieves the challenge every time; superior use of sensors |
| **Structure** | Structure is fragile, falling apart under normal use | Structure often holds together under normal use, but is cumbersome or inefficient | Structure is strong and efficient; almost always holds together under normal use | Structure is both solid and elegant; holds up against mishandling |
| **Program** | Program unable to complete the challenge; not linked to sensors; illogical | Program often completes the challenge, but inconsistently, inaccurately, or taking more time than needed | Program is logical and efficient; achieves the challenge all or almost all of the time | Program is surprisingly sophisticated; achieves the challenge all of the time |

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| **Self-evaluation for SPICE Model** 1. Were my sketches clear enough for others to understand?  |
|   | 1 | 2 | 3 | 4 | 5 |
| 2. Did I include written suggestions on my rough sketch? |
|   | 1 | 2 | 3 | 4 | 5 |
| 3. Did my product do what I designed it to do?  |
|   | 1 | 2 | 3 | 4 | 5 |
| 4. If I worked with others, how well did I cooperate?  |
|   | 1 | 2 | 3 | 4 | 5 |
| 5. If I worked with others, how would I rate my contribution to the product?  |
|   | 1 | 2 | 3 | 4 | 5 |
|  (5= My best effort; 3 = Medium; 1 = Poor effort)  |

**Accommodations and Modifications**

Accommodations

* Allow access to the video provocations before and after lesson for developing background knowledge and review
* Have students work in groups or partners for research and design challenges
* Chunk the list of steps and include visuals to assist in completing the design challenges
* Allow students more time to complete the task
* Allow students to suggest another platform (to build on or to program with) or group of materials for completing the task to utilize students’ prior knowledge
* Reduce the complexity of the challenge (i.e., reduce number of success criteria)

"Growing Success: Assessment, Evaluation, and Reporting in Ontario's Schools, First Edition Covering Grades 1-12", 2010) <http://www.edu.gov.on.ca/eng/policyfunding/growSuccess.pdf>

Modify an expectation for this activity based on student’s IEP

* E.g., Grade 8 language expectation, Writing strand: (Students will) write complex texts of a variety of lengths, using a wide range of forms.
* Modified expectation: (The student will) write patterned short texts using specified forms.