2011-2012
VTAAP Science

Administration Guidelines

VERMONT
DEPARTMENT OF EDUCATION

Vermont Alternate Assessment Portfolio

TABLE OF CONTENTS

1. General Requirements for VTAAP Science

The VTAAP science assessment has four main components - one entry point target in each of the three content knowledge domains and a set of inquiry skills in a full inquiry investigation. As with the reading and math content areas, the VTAAP science assessment tasks should be as closely connected to the grade level curriculum as possible. The collaborative, hands-on nature of science instruction presents a unique opportunity to incorporate the topic, activities, materials, and learning partners from the general education classroom. (For a graphic summary of the general requirements, see Appendix I - *VTAAP Science Overview*.)

Although evidence of student achievement for the statewide assessment is submitted only in grades 4, 8, or 11, this information may be collected at any point in the designated grade span (e.g., 3-4; 5-8; 9-11). As a general rule, if instruction in a particular area occurs across successive grades, the Student Evaluation Team (SET) should submit evidence that supports the highest or most current level of student learning.

2. Content Knowledge Domains - Entry Point Structure

A comprehensive but reduced set of GEs has been identified for the science alternate assessment. To further facilitate access to the designated standards for students who are considered for alternate assessment, a 3-tiered set of entry points has been developed. (*See Introduction to Entry Points.*) Each GE entry point specifies the Conditions, Target Behavior(s), and Criteria necessary for the SET to design and administer the assessment.

A. Conditions for the entry points define the supports, materials, or contexts that are necessary to demonstrate the target skill as expected. Most students participating in the VTAAP will necessarily require some supports or tools to address complex grade-level skills and achieve their VTAAP assessment targets. While it is anticipated that instructors will employ a wide variety of scaffolding during the course of instruction, it is critical for VTAAP administrators to select their *assessment* supports very carefully to ensure that they do not interfere with independent student performance. For science, expectations regarding Assistive Technology (AT) supports are generically identified. This is intended to provide wide latitude to the SET regarding the particular context of skill demonstration. In the Condition column, note that at the 'A' level, supports are encouraged although not required: however, at the 'B' and 'C' levels, they are considered essential and are required. The SET must provide detailed information about the format and the use of any supports during formal assessment on *VTAAP Form 3 - Baseline Record.*

B. Target Behavior defines the specific measurable behavior(s) that the student must perform to demonstrate acquisition of the designated GE. The italicized text at the head of the column in grey (called the extended GE stem) is combined with the text at each entry point level to define the target behavior for assessment. SETs are advised to pay close attention to the entry point descriptions in order to successfully design and administer the required Baseline and Endline assessments. Each entry point target is further deconstructed into a specific set of discrete behaviors in the *Student Performance Scoring Guide*.

The entry points were written for students with a wide range of abilities and communication skills. The verbs selected are intended to preserve the integrity of the GE, while also allowing students with different methods of communicating to demonstrate the target skills. Terms such as "identify," "select," "indicate," etc. are used to represent an action by the student that

communicates his or her intended response. Generally, students can use any response that matches the GE expectation, the task, and their abilities. If the particular response mode is not possible for the student, the SET should determine a suitable replacement that is within the student's capabilities. It is important that the assessment accurately measure the student's content area skills, without the interference of particular communication challenges.

For students who are pre-symbolic (level C), it is understood that the entry points support the development of a more consistent signal (communication) system and enhance receptive vocabulary. The emphasis should be on matching, "indicating" (signaling, or other intentional response), or otherwise responding to the context in a way that indicates *learning*. If it can be demonstrated that the student is responding to a situation differently over time due to consistent routines, structure and input, then that is documentation of learning. Initially, it may be necessary to look for these changes on a very small scale (e.g., Does the student show a reduction or increase of activity associated with the initiation of the routine? Does a student look towards the target materials? Does a student show anticipatory reactions when s/he recognizes key task elements or is close to a significant event?)

C. Criteria are intended to make the entry points more transparent to the SET and provide a *minimum* standard of evidence necessary to demonstrate learning in the student products. As a general rule, the emphasis of all the GE entry points is on the demonstration of the target concepts, skills and knowledge at Endline in sufficient quantity and quality to infer genuine strength (acquisition/generalization) in the learning. The examples (e.g…..) are *suggestions* for appropriate instruments to adequately demonstrate independent student achievement and are not intended to be prescriptive or restrictive. The team should always plan and choose the activity and materials that will *best* represent the individual student's learning.

3. Selection of GE Entry Points for Content Knowledge Domains

The VTAAP requires a single content knowledge GE entry point to be assessed in each of the domains (1 physical science + 1 life science + 1 earth and space science = 3 total). Unlike reading and math in which a pre-selected GE is standardized for students by grade level, each content knowledge domain in science offers a number of GE options (4-6) from which the SET can select its assessment target for that domain. These alternatives are intended to facilitate the active connection with on-going classroom curriculum and present VTAAP students with multiple opportunities to connect with areas of personal interest.

VTAAP Form 2: Entry Point Declaration requires the team complete a short inventory of the student's current communication and reading skills from which the appropriate entry point level (A, B, or C) is automatically assigned. While teams do have the freedom to select entry point *content* from an array of choices, they will not be able to select entry points at a different level than that assigned by the inventory. Because they relate to skills that are *student* specific, Entry Point levels for the VTAAP are uniform across all content areas (e.g., a student with A level communication and reading skills (symbolic) in math will be targeting A level entry points in science and reading as well).

The GE options for each grade are found in the science entry point document. (http://education.vermont.gov/new/html/pgm_alternate/entry_points.html) The SET should review the list of GE options at the designated entry point level within each domain (Physical science, Life science and Earth & Space science) and select <u>one GE entry point per domain</u> for

assessment in the VTAAP. Reviewing science entry point choices for the appropriate communication level and grade span, the team members look to identify a domain target that combines, if possible, student personal interest with peer group instruction in the grade-level classroom. The entry point statements in the behaviors and criteria columns are intended to describe the desired outcome for the student after a minimum of 30 calendar days of focused instruction. If the SET feels that the student could already demonstrate the skill (or could with very little instruction), then it should select a different entry point within the domain. Although the criteria establish a *minimum* standard for student products, the SET is encouraged to administer the most challenging Baseline that they can envision the student addressing at the end of instruction. All entry points are written to be taught and tested to the fullest extent possible.

The SET may, if it chooses, declare all of their science assessment targets at the beginning of the school year, but it must select at least one of the three domain target GEs by October 15 and document the GE selection on *VTAAP Form 2: Entry Point Declaration.* The remaining two content knowledge entry points may be identified and entered on Form 2 any time before February 15.

4. Summary of GE Entry Point Selection Process

- Read *2011-2012 VTAAP Science - Administration Guidelines* (this document).
- Review the appropriate grade-cluster section of the *VTAAP GE Entry Points for Science.*
- Discuss the GE entry points with the classroom science teacher (identified in *Form 1*) and identify areas that are relevant for the student and that connect well to the classroom curriculum.
- Consider the current communication and reading skills of the student and complete the skills inventory on *VTAAP Form 2* to determine the correct entry point level (A, B or C).
- Select one GE entry point for *each* domain (Physical, Life and Earth/Space) from the student's grade-cluster options.
- Complete online *VTAAP Form 2: Entry Point Declaration* for the science component. At least one entry point in any domain must be selected by October 15; the remaining entry point targets for the other domains may be selected on this form any time before February 15.

The first Content Knowledge Domain target must be baselined and documented on *VTAAP Form 3 - Baseline Record* by Dec. 15.

5. Baseline Assessment of Content Knowledge GE Entry Points

Regardless of when the appropriate domain target is identified, the VTAAP requires the SET to conduct a formal Baseline assessment to determine the student's level of understanding of the entry point target prior to instruction. In order to qualify for the assessment, Baseline accuracy must be at or below 50%. As in the reading and math assessments, this assessment task must be diligently planned to evaluate student performance on all parts of the entry point, including any criteria Specified in the *Student Performance Scoring Guide*. Any skills that are not measured at Baseline will not be reported in the final Endline achievement results. Baselines may be augmented after the initial administration if necessary as long as they are documented in a revised VTAAP Form 3 and the additional student Product is included with the previous assessment products. All baselines records are closed and no further edits are allowed on March 30. The development of assessment tasks should always begin "with the end in mind."

Generally speaking, Student Products for science are subject to the same requirements as those in the other content areas. All Baseline products submitted for the content knowledge domains must be accompanied by a printed and attached *VTAAP Form 3: Baseline Record* and all Endline products accompanied by a printed and attached *VTAAP Form 5: Endline Record*. These provide critical assessment context information, including student and evaluator roles, the use of materials and supports, and the connection to grade-level curriculum and serve as the required product labels. All of the requested information must be completed to validate the corresponding Student Product.

6. Endline Assessment of Content Knowledge GE Entry Points

Student performance scores have been expanded to include the measurement of student progress above the Baseline accuracy; therefore, it is essential that Baseline tasks align directly with those administered at Endline. This requires a thorough understanding of both the entry point behaviors and appropriate product formats before the Baseline assessment is administered.

The VTAAP science content domain targets are formally assessed at the end of instruction, using the *same* assessment as Baseline (or the aggregation of Baseline assessments). In order to qualify, Endline assessments must be dated to show a minimum instructional interval of 30 days from Baseline. The information from *VTAAP Form 3 - Baseline Record* will be automatically transferred to *VTAAP Form 5 - Endline Record.* Any behaviors or conditions that have not been baselined will be disqualified from the Endline assessment and will not be scored. Though teachers may continue with content instruction, the VTAAP requirements for any strand in science may be considered fully satisfied if the independent student performance represents a thorough understanding that is at or above 75%.

7. Summary of Assessment of Content Knowledge Entry Points – Baseline & Endline

Baseline:

- For each selected content knowledge GE entry point identified on *VTAAP Form 2*, design a Baseline assessment task to measure all of the Target Behaviors and Criteria detailed in the entry point and student performance scoring guide documents.
- Administer formal Baseline assessment tasks on all entry point skills that will be assessed at Endline.
- Complete and print an online *VTAAP Form 3: Baseline Record* for each science content domain that has been assessed: one of the domain targets must be documented by Dec. 15, and the remaining two domains baselined no later than March 30.
- Annotate the product evidence (name, date, evaluator, etc.) associated with the Baseline tasks and place in the student's VTAAP science portfolio with printed Form 3 for later submission.
- Based on assessment results, plan and implement instruction including Grade-Level General Education Curriculum and the use of Assistive Technology supports and strategies.
- Revise Baseline Record as necessary if assessment conditions or behaviors change. Be sure to place new Student Product evidence with previously baselined materials in VTAAP science file.
- After instruction (min. 30 days), administer Endline assessment using the same comprehensive Baseline assessment (initial + any revisions).

Endline:

- Endline assessment of any Content Knowledge Domain strands can be considered complete and the assessment requirements fully satisfied after the minimum 30-day period and if student accuracy is 75% or greater.
- Complete and print online *VTAAP Form 5 - Endline Record* to document the Endline assessment.
- Annotate the product evidence (name, date, evaluator, etc.) associated with the Endline tasks, attach printed Form 5, and place in the student's VTAAP science portfolio with printed Form 3 and Baseline Student Product evidence for later submission.

8. VTAAP Inquiry Process - General

The Inquiry Process is a multi-step investigation that begins with identifying a teacher or student generated question and making a prediction, moves on to collecting relevant information, recording and organizing it clearly, and concludes with the sharing of findings or conclusions. The gathering of information can take many forms, including researching existing data, conducting surveys, observing situations, and/or conducting experiments. Teaching and learning should focus on becoming familiar with the common concepts and procedures associated with conducting inquiries through meaningful experiences and practice with the related materials and procedures.

For VTAAP, students must complete one inquiry focused on one of the science content knowledge GEs and investigating *either* an Experimental (cause/effect) question or an Observational question (See Appendix II - *Sample Inquiry Questions and Resources).* Although the student is expected to participate in numerous inquiry activities (including surveys and research) over a designated grade-span, an Experimental or Observational inquiry is the only allowable context for VTAAP, and the inquiry must be completed in grades 4, 8, and 11.

All portfolio entries for the required inquiry follow a standardized 3-stage/8-step format and must document how each step in the inquiry process is completed (Appendix III – *VTAAP Form 5: Science Inquiry Worksheet*). This documentation provides a clear record of the sequence of the inquiry process and the student's type and degree of involvement in each stage. Within this larger comprehensive process, VTAAP requires the SET to target a specific inquiry skill in each stage for formal evaluation of independent student performance.

The student's participation in the inquiry process and the performance results of the individual steps will vary depending on the student's personal experiences, level of symbolic development, the topic of the inquiry, and the method of data collection selected. For the purposes of the VTAAP documentation, student participation has been simplified to three general descriptors:

- ☐ **Directed** - Teacher does all or almost all of the inquiry skill.
- ☐ **Cooperative** - Teacher (or other peers) and student do the inquiry skill together.
- ☐ **Independent** - Using teacher-free supports, student does the inquiry skill independently.

9. VTAAP Science Inquiry Assessment

There is no Baseline assessment requirement for science inquiry. Student performance is evaluated solely on the evidence submitted for Endline. This evidence includes a fully completed

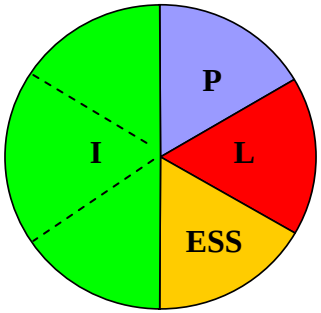
Science Inquiry Worksheet and Student Product evidence for each of the three inquiry stages. Student involvement is recorded on the worksheet for all eight steps of the process by both documenting the result of each step and marking the appropriate participation box (Directed, Cooperative, or Independent). The actual scoring of Endline student achievement is limited to the student's performance on the particular skill in each stage specified by the SET. There must be a discrete Student Product that clearly demonstrates the designated inquiry skill for each stage. The explanation of each of the 3 products must be documented in the Stage Product Description section of the worksheet, and the product itself must be clearly identified with the student name and date and stage number. Products that are not identified or do not match label descriptions will not qualify for scoring. Scorers will examine and evaluate student performance for each stage using the *Inquiry Target Behaviors* document (Appendix IV) and then assign an overall inquiry rating.

For purposes of efficiency, all information related to student participation and product description is summarized on the online *VTAAP Form 5 - Science Inquiry Worksheet.* This completed worksheet is submitted with hard copy student independent achievement evidence for each stage of the inquiry and scored at the Portfolio Scoring Institute. Inquiry submissions that do not have a science content focus or contain incomplete worksheets or completed worksheets with no accompanying products will not be scored.

10. Summary of Assessment of Inquiry

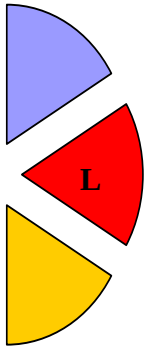
- Review the inquiry skills on the Science Inquiry Worksheet.
- Discuss the Inquiry requirements with the classroom science teacher (identified in *Form 1)* and identify specific opportunities for the student to participate and practice the inquiry process in the general education curriculum.
- Indicate on *VTAAP Form 2* the science content Domain and focus GE for the inquiry agreed upon with the classroom teacher.
- Select a target skill in each stage of the inquiry that will allow the student to best demonstrate independent performance.
- In collaboration with the classroom teacher, instruct and practice all worksheet inquiry skills in the topic area selected for VTAAP investigation. Collect Student Product evidence of independent student performance for the target skill designated by the SET in each of the three stages. Be sure to fully identify/annotate products.
- Complete and print the online VTAAP *Form 5 – Science Inquiry Worksheet.* This online documentation of inquiry evidence will be submitted with the related hardcopy evidence of student achievement for the three SET designated inquiry skills.

Appendix I- VTAAP Science Overview



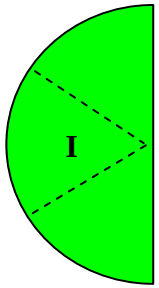
VTAAP Science portfolio

- ☐ 1 content knowledge target in **Physical Science** domain
- ☐ 1 content knowledge target in **Life Science** domain
- ☐ 1 content knowledge target in **Earth & Space Science** domain
- ☐ 1 complete 3 stage, 8 step **Inquiry**
- ☐ Submit in grades 4, 8, 11 by May 15



Content Knowledge Domain (repeated for each of the 3 content knowledge domains)

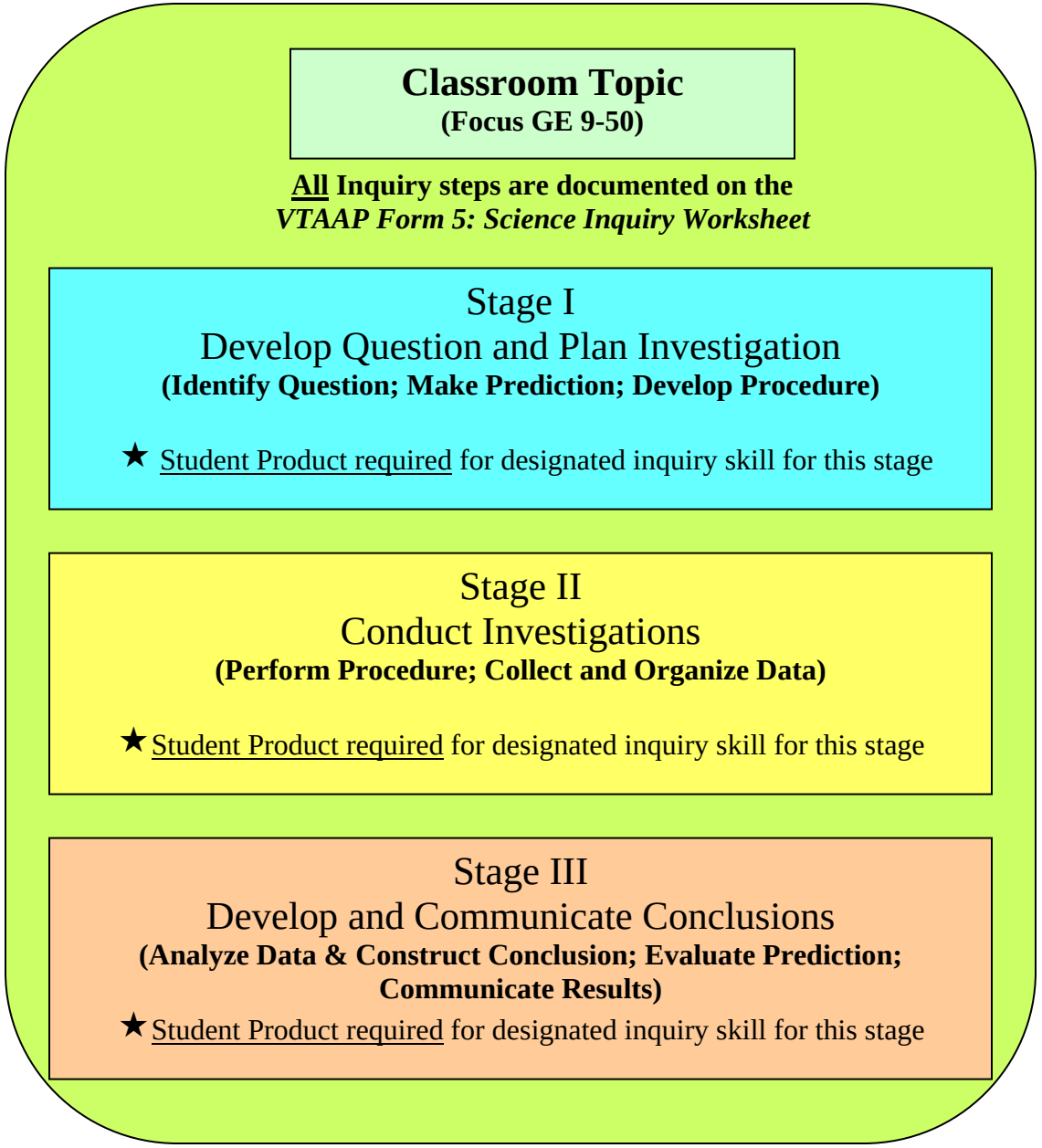
- ☐ Collect and document anytime in designated grade span (3-4; 5-8; 9-11)
- ☐ Connect to grade-level classroom curriculum (topic, activities, materials)
- ☐ Select and declare content knowledge target *(VTAAP Form 2: Entry Point Declaration*); at least 1 by Oct. 15, remainder by Feb. 15
- ☐ Conduct and document Baseline assessment *(VTAAP Form 3: Baseline Record*)
- ☐ Conduct and document Endline assessment *(VTAAP Form 5: Endline Record)*
- ☐ Submit Baseline & Endline Student Products by May 15



Inquiry Investigation

- ☐ Connect to grade-level classroom curriculum (topic, activities, materials)
- ☐ Identify domain & GE focus area
- ☐ 3 stages, 8 steps
- ☐ Document participation on all 8 steps *(VTAAP Form 5: Science Inquiry Worksheet)*
- ☐ 1 Student Product required for each stage (no Baseline)
- ☐ Submit 3 required Student Products and fully completed Worksheet by May 15

Science Inquiry



Appendix II- Sample Inquiry Questions and Resources

Different types of questions suggest different kinds of inquiry.

Experimental Questions

Require observations, but also have a cause and effect relationship; problem–posing, solution-finding, or action-taking questions

- If I change the amount of sunlight, then which plants will grow taller?
- What happens if I give more fertilizer to some plants than others?
- Can I find a way to make my soap box derby car go faster?
- How will the number of magnets affect the speed of the motor?
- How does the height of the ramp affect the distance a ball travels?

NECAP Released Performance Tasks:

(http://education.vermont.gov/new/html/pgm_assessment/necap/resources/released_items.html#science_08)

- Sled Pull (Grade 4): How does increasing the weight of an object affect the amount of force needed to make it move?
- Bird Beaks and Survival (Grade 4): Which beak will pick up the most different kinds of food?
- Pond Weeds (Grade 8): How do weevils affect the growth of EWM in a lake?
- Driver's Education (Grade 11): How does the mass of a moving vehicle affect its stopping distance? How does the speed of a moving vehicle affect its stopping distance?

NECAP Practice Tests:

(http://education.vermont.gov/new/html/pgm_assessment/necap/resources/practice_tests.html#science)

- Playground Trash (Grade 4): Will putting magnets together make a difference in the distance needed to attract objects?
- Rainy Morning (Grade 8): How will the mass of a parked car affect the distance it moves when hit? How might the slope of the hill affect the distance the parked car moves?
- Acid Lakes (Grade 11): How do the effects of talc on the pH of an acidic lake compare with the effects of lime (calcium carbonate)?

Additional science performance tasks are available at: http://rlv.education.vermont.gov

- Username: vt.teacher
- Password: vermont (Password is case sensitive.)
- Click on "Instructional Organizer" tab.
- Click on "Activities."
- Insert "Science" in the search feature to find assessments or go to the bottom of page 34 where they begin.

Observational Questions

Involve observing, describing, comparing, measuring, classifying object, organisms, or events

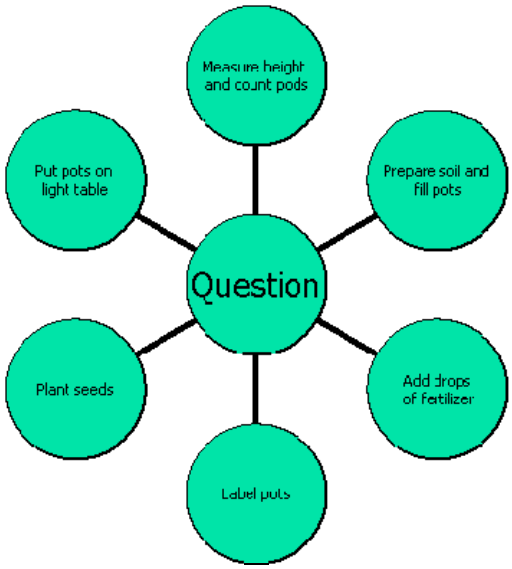
- What do I see, feel, smell when I study these rock samples?
- How are the rabbit and guinea pig the same or different?
- What is the same about the leaves from different trees?
- What plants are in the wetland?
- What are the properties of solids, liquids, and gases?
- What happens to liquids in open containers?
- How does the shape of the moon change over time?
- Where has soil been eroded on the hillside?

NECAP Released Performance Tasks:

- Colliding Plates (Grade 8): What might happen to the sand in the model when the Eurasian and Indian Plates move toward each other?

Creating an Experimental Design

Question: If I change the amount of fertilizer, how will it affect the growth of my plants?



1. Teacher and student work together using graphic organizer (e.g., *Inspiration* software) to brainstorm the steps necessary to answer the question.

2. Review steps and clarify which variable will change and which variables will stay the same.

3. Order the steps in an appropriate sequence to create the Experimental Design.

The Experimental Design

Data Collection Plan	
Experimental Question:	If I change the amount of fertilizer, how will it affect the growth of my plants?
Procedure - Steps to follow:	1. Mix soil with water and then fill three pots with 250 ml of soil. 2. Plant three seeds 5 cm deep in each pot. 3. Place pots equal distance from grow light in the same room at the same temperature. 4. Add 1, 3, 5 drops of fertilizer to three different planting pots every three days. 5. Label the pots. 6. Measure height of plant each day and record the data. 7. Count the number of seed pods.
Variables that remain the same:	• Number & type of seeds • Depth of planting • Amount of water • Amount of light • Amount of soil temperature
Variable that changes:	• Amount of fertilizer in each planting pot
Things to measure/observe:	• Height of plants • Number of pods

Appendix III

2011-2012 VTAAP Form 5: Science Inquiry Worksheet

Date(s) of Investigation:

Student Name:

Communication Level:

Grade:

Unit/Topic Area:

General Directions: *This worksheet is used to document the student's participation in the inquiry process for science. It replaces the standard VTAAP Form 5 used for reading, math, and the science content knowledge domains.* ***This form is required, and all sections must be completed in their entirety for the inquiry submission to be eligible for scoring. Please print and attach directly to the student product evidence for inquiry. Three distinct products are required (1 product for each inquiry stage). Student products submitted without the worksheet or with an incomplete worksheet will not be scored.***

Description of General Education Curriculum Activity

Content Focus: Identify the content knowledge domain and GE (9-50) connected to this inquiry

Domain: GE:

GLGEC: How does this inquiry task reflect a theme, topic, or unit of study from the Grade-Level General Education Curriculum?

Stage I: Develop Question and Plan Investigation

Directions: Students receive instruction and participate in all elements of the multi-step inquiry process, but they are ***formally assessed on only one skill element in each stage****. These skills targeted for formal assessment are determined by the Student Evaluation Team (SET) and should represent* ***independent student behaviors****. Inquiry steps in each stage that are not assessed may be completed cooperatively or even be directly provided by the teacher. Regardless,* ***all of the inquiry steps must be completed****, and the level of student participation documented as either Directed or Cooperative or Independent (see Science Administration Guidelines for more information).* ***The information in the skill area specified for assessment must be accompanied by a student product*** *representing independent performance on the skills detailed in the Inquiry Target Behaviors document. A full explanation of the assessment task must be included in the Stage I Product Description.*

Inquiry Skill (Target Behavior) *(Complete all text fields in this column)*	**Skill Description (Criteria)** *(Do not write in these sections)*
Identify a Question: What question will be investigated? ☐ Directed ☐ Cooperative ☐ Independent	The inquiry is based on either an: Experimental Question (cause/effect relationship) OR Observational Question (answered primarily through observations).

Make a Prediction: What might happen and why? ☐ Directed ☐ Cooperative ☐ Independent	The Prediction states what will happen AND uses the student's past experience or knowledge to justify the prediction. *I predict . . .* *because. . . . .*
Develop a Procedure: What steps will the student follow? ☒ Directed ☐ Cooperative ☐ Independent	Procedure for an **Observational Question:** The individual steps that must be followed in order to gather data to answer the question are identified in sequence.
	Procedure for an **Experimental Question:** The individual steps that must be followed in order to gather data to answer the question are identified in sequence. AND An experimental procedure must also specify which variables will remain the same and which variable will change.

Stage I Product Description

Assessment Product Options *(Select one):*
☐ Identify a Question
☐ Make a Prediction
☐ Develop a Procedure

Product Format (*Select one):*
☐ Original student work + Printed copy of Form 5- Science Inquiry Worksheet
☐ Graphic representation (photos, videos) + Printed copy of Form 5- Science Inquiry Worksheet
Include all of the following:
- Task content
- Materials
- Results of the student's performance

Assessment Administration: *(VTAAP products must represent independent student performance. Briefly describe the roles of the teacher and student and the use of teacher-free supports for development the Stage I Product).*

Teacher role:

Student role:

Supports used:

Stage II: Conduct Investigations

*Directions: Students receive instruction and participate in all elements of the multi-step inquiry process, but they are **formally assessed on only one skill element in each stage**. These skills targeted for formal assessment are determined by the Student Evaluation Team (SET) and should represent **independent student behaviors**. Inquiry steps in each stage that are not assessed may be completed cooperatively or even be directly provided by the teacher. Regardless, **all of the inquiry steps must be completed**, and the level of student participation documented as either Directed or Cooperative or Independent (see Science Administration Guidelines for more information). **The information in the skill area specified for assessment must be accompanied by a student product** representing independent performance on the skills detailed in the Inquiry Target Behaviors document. A full explanation of the assessment task must be included in the Stage II Product Description.*

Inquiry Skill (Target Behavior) *(Complete all text fields in this column)*	**Skill Description (Criteria)** *(Do not write in these sections)*
Perform the Procedure: What steps did the student do? ☐ Directed ☐ Cooperative ☐ Independent	The steps in the procedure identified in the Investigation Design that were actually completed are identified.
Collect and Organize the Data: What data was collected and how was it organized? ☐ Directed ☐ Cooperative ☐ Independent	The data are collected and organized in a table, a graph, and/or represented in a labeled scientific drawing.

Stage II Product Description

Assessment Product Options *(Select one):*
☐ Perform the Procedure
☐ Collect and Organize the Data

Product Format (*Select one):*
☐ Original student work + Printed copy of Form 5- Science Inquiry Worksheet
☐ Graphic representation (photos, videos) + Printed copy of Form 5- Science Inquiry Worksheet
Include all of the following:
- Task content
- Materials
- Results of the student's performance

Assessment Administration: *(VTAAP products must represent independent student performance Briefly describe the roles of the teacher and student and the use of teacher-free supports for development the Stage II Product.)*

Teacher role:

Student role:

Supports used:

Stage III: Develop and Communicate Conclusions

*Directions: Students receive instruction and participate in all elements of the multi-step inquiry process, but they are **formally assessed on only one skill element in each stage**. These skills targeted for formal assessment are determined by the Student Evaluation Team (SET) and should represent **independent student behaviors**. Inquiry steps in each stage that are not assessed may be completed cooperatively or even be directly provided by the teacher. Regardless, **all of the inquiry steps must be completed**, and the level of student participation documented as either Directed or Cooperative or Independent (see Science Administration Guidelines for more information). **The information in the skill area specified for assessment must be accompanied by a student product** representing independent performance on the skills detailed in the Inquiry Target Behaviors document. A full explanation of the assessment task must be included in the Stage III Product Description.*

Inquiry Skill (Target Behavior) *(Complete all text fields in this column)*	**Skill Description (Criteria)** *(Do not write in these sections)*
Analyze the Data and Construct a Conclusion: What did the student discover? ☐ Directed ☐ Cooperative ☐ Independent	A reasonable explanation that accurately reflects the collected data is provided.
Evaluate the Prediction: Did the collected data support the prediction? ☐ Directed ☐ Cooperative ☐ Independent	The prediction from Stage I is compared to what actually happened in the inquiry.
Communicate the Results: How did the student share findings from this investigation? ☐ Directed ☐ Cooperative ☐ Independent	The results/conclusions are presented, questions answered, or explanations provided for a specific audience.

Stage III Product Description

Assessment Product Options *(Select one):*
☐ Analyze the Data and Construct a Conclusion
☐ Evaluate the Prediction
☐ Communicate the Results

Product Format (*Select one)*
☐ Original student work + Printed copy of Form 5- Science Inquiry Worksheet
☐ Graphic representation (photos, videos) + Printed copy of Form 5- Science Inquiry Worksheet
Include all of the following:
- Task content
- Materials
- Results of the student's performance

Assessment Administration: *(VTAAP products must represent independent student performance. Briefly describe the roles of the teacher and student and the use of teacher-free supports for development the Stage III Product.)*

Teacher role:

Student role:

Supports used:

Appendix IV

2011-2012 VTAAP Inquiry Target Behaviors

STAGE I: Develop Question and Plan Investigation

Inquiry GE: 1- Identify a Question

Students demonstrate their understanding of scientific questioning by:

Required	Extended	Not allowed
• Using personal experience or interest to generate question • Identifying a question that can be answered either through close observation or an experiment (cause/effect)	o Developing a question that shows evidence of prior scientific knowledge	☒ Using a Research question

Inquiry GE: 2- Make a Prediction

Students demonstrate their understanding of predicting and hypothesizing by:

Required	Extended	Not allowed
• Identifying what may happen in the future • Supporting the prediction with logical reasoning	o Using personal experience to support prediction o Supporting prediction with scientific reasoning	☒ Random guessing

Inquiry GE: 3- Develop a Procedure

Students will demonstrate their understanding of experimental design by:

Required	Extended	Not allowed
• Developing a procedure that will gather evidence to answer the question posed • Identifying a logical sequence of steps	o Identifying the independent and dependent variables for experimental questions o Using scientific terminology appropriate to the investigation o Specifying a list of materials and/or measurement tools	☒ Providing single photograph of materials and set up

STAGE II: Conduct Investigations

Inquiry GE: 4- Perform the Procedure

Students demonstrate their ability to conduct experiments by:

Required	Extended	Not allowed
• Completing steps identified in the planned procedure • Conducting multiple trials	o Using appropriate measurement tools o Using scientific notebook or other suitable format to record findings/ observations throughout procedure o Using technology to collect and store information	☒ Random investigation ☒ Directional prompting

Inquiry GE: 5- Collect and Organize the Data

Students demonstrate their understanding of predicting and hypothesizing by:

Required	Extended	Not allowed
• Collecting relevant data • Organizing data into related categories • Using appropriate representation to display data (e.g., graph, table, chart, scientific drawing)	o Representing data quantitatively o Using scientific language to label or represent data o Using technology effectively to organize and represent data	☒ Random or unorganized notes and/or observations

STAGE III: Develop and Communicate Conclusions

Inquiry GE: 6- Analyze the Data and Construct a Conclusion

Students demonstrate their ability to analyze data by:

Required	Extended	Not allowed
• Relating data to the original question • Providing a reasonable explanation that accurately reflects the data • Interpreting the data for patterns and trends	O Identifying limitations and sources of error within the design O Analyzing significance of data O Using knowledge of scientific concepts to evaluate data	☒ Simply restating the data

Inquiry GE: 7- Evaluate the Prediction

Students demonstrate their ability to explain data by:

Required	Extended	Not allowed
• Comparing the proposed predication and actual data • Declaring whether original predication was/was not supported	O Identifying changes in thinking or beliefs	☒ Simply restating original prediction

Inquiry GE: 8- Communicate the Results

Students will demonstrate their ability to apply results by:

Required	Extended	Not allowed
• Re-stating the original question to others not directly involved in the inquiry • Sharing findings related to the question with others not directly involved in the inquiry • Stating conclusion(s) with others not directly involved in the inquiry	O Sharing with a variety of audiences O Comparing results to findings of others O Proposing new questions or investigations O Using technology to communicate results effectively	☒ Sharing results with instructing teacher only