ILEARN Blueprints & Specifications: Science

#IDOEILEARN

Follow us!

Working Together for Student Success
Agenda

• The Assessment Journey
  Where did this assessment come from?

• Blueprints
  What are blueprints and how do they inform assessment?

• Specifications
  How are students assessed? What can I expect on ILEARN Science?

• Performance Tasks
  What are they? Why are they on ILEARN? How are they created?

• Q&A
The Assessment Journey

Where did this assessment come from?
Guiding Principles

- Student-centered
- Accessible
- Transparent
- Indiana-aligned
- Evidence-based
- Technically sound
Quality assessment is a deliberative and collaborative process involving Indiana educators.
Collaborating with Stakeholders

We are building ILEARN from the ground up, and educators are involved in every step!

**INDIANA ACADEMIC STANDARDS** Educators defined the knowledge and skills students should achieve at each grade level for each content area.

**BLUEPRINTS** Educators define essential content from the standards and appropriate proportions of the standards for the assessment.

**ITEM SPECIFICATIONS** Educators determine how each standard should be measured (e.g., evidence statements, item types, cognitive complexity, etc.)

**ITEM DEVELOPMENT** Educators develop new items to ensure the assessment of the breadth and depth of Indiana Standards.

**ITEM ACCEPTANCE** Educators review items from licensed banks to determine alignment with Indiana Standards.

**DATA REVIEW** Educators review statistical data from field-test items to determine if the items can be used operationally.

**SCORING** Educators score open-ended items for field test (calibrate the scoring through range finding) and operational data.

**STANDARD SETTING** Educators determine cut scores for each proficiency category.

**DATA REVIEW** Educators review statistical data from field-test items to determine if the items can be used operationally.

**ITEM DEVELOPMENT** Educators develop new items to ensure the assessment of the breadth and depth of Indiana Standards.

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**INDIANA ACADEMIC STANDARDS** Educators defined the knowledge and skills student should achieve at each grade level for each content area.
Educator Involvement: Handscoring

• IDOE will involve educators to the extent possible
  Approximately 3-4 educators from each corporation
• Full-time commitment to a 3-week scoring window each spring
  Following ILEARN administration
• All participation is remote
e.g., training, qualification, scoring
• Educators will be compensated at state rate
• PGPs will be available to all educators

More details coming soon!
## Implementing Improvements

### Computer Adaptive
- Math and ELA
- Unique student experience that always meets the blueprint
- Adapts on difficulty, not across grade levels unless content aligns at multiple grade levels

### Additional Student Supports and Accommodations
- Translations
- Glossaries
- Embedded Dictionary/Thesaurus
- Spell Check
- Rich Text Tools
- Accessible Calculator
- Intuitive Graphing Interfaces
- American Sign Language

### Improved Testing Times
- Single testing window at the end of the year
- Decreased test length (average 2 hours shorter total at each grade level)
- Untimed sessions

### Improved Reporting Structures
- Individual student results in 12 days*
- Final results by July 1*
- More detailed student reports for computer adaptive tests
- Revised cut scores and proficiency levels (by educator committee)

### Technology Setup and Requirements**
- Small IT and bandwidth footprint
- No local caching
- Secure Browser is the only required software
- Includes diagnostic tools
- “Sessionless” testing; no test tickets or seal codes
- Testing managed from examiner/teacher device

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*These times will begin in 2020 due to setting cut scores in Summer 2019. Final reporting will be available Aug 15 for 2019.

**Full system requirements will be available in the Indiana Portal. Session management policy and procedures will be available by Oct 1, 2018.
Blueprints

What are blueprints and how do they inform assessment?
Blueprints

https://www.doe.in.gov/assessment/ilearn-educators

• Aligns expectations regarding mastery of standards
  What knowledge and skills do we need to measure?

• Identifies the degree of emphasis for curricular components
  What knowledge and skills are most essential for future success?
## ILEARN Science Grade 4 Blueprint

**Reporting category** identifies the high-level process skill(s) being assessed.

<table>
<thead>
<tr>
<th>Reporting Category</th>
<th>Standard</th>
<th>Standard Item Range</th>
<th>Standard % of Test</th>
<th>Reporting Category Item Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questioning and Modeling (25–29%)</td>
<td>3-5.CD.1</td>
<td>0–1</td>
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<tr>
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<tr>
<td></td>
<td>4.ESS.1</td>
<td>1–3</td>
<td>2–7</td>
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<td>SEPS.2</td>
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<table>
<thead>
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<tr>
<td></td>
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<td>Min</td>
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<tr>
<td>Questioning and Modeling (25–29%)</td>
<td>3-5.CD.1</td>
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<tr>
<td></td>
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</tr>
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</table>

IAS code for the individual standards in this reporting category.
## Reporting Category: Questioning and Modeling (25–29%)

<table>
<thead>
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<th>Standard</th>
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<td>3-5.DI.2</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td><strong>3-5.E.1</strong></td>
<td><strong>1</strong></td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
</tr>
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*Item range is the number of items for that standard or category in a given year.*
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<td>0</td>
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<td></td>
<td>SEPS.2</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Percent range is the weight of each standard on the assessment as a whole.
Comparison of reporting categories

<table>
<thead>
<tr>
<th>ISTEP+ Reporting Categories (Elementary)</th>
<th>ILEARN Reporting Categories (Elementary)</th>
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</thead>
<tbody>
<tr>
<td>Physical Science</td>
<td>Questioning and Modeling</td>
</tr>
<tr>
<td>Earth Science</td>
<td>Investigating</td>
</tr>
<tr>
<td>Life Science</td>
<td>Analyzing, Interpreting, and Computational Thinking</td>
</tr>
<tr>
<td>Science, Engineering and Technology</td>
<td>Explaining Solutions, Reasoning, and Communicating</td>
</tr>
<tr>
<td>The Nature of Science</td>
<td></td>
</tr>
<tr>
<td>The Design Process</td>
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</table>
### Comparison of reporting categories

<table>
<thead>
<tr>
<th>Elementary Reporting Categories</th>
<th>Weight by Percent (Grade 4)</th>
<th>Weight by Percent (Grade 6)</th>
<th>High School Reporting Categories (Biology)</th>
<th>Weight by Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questioning and Modeling</td>
<td>25-29%</td>
<td>21-25%</td>
<td>Developing and Using Models to Describe Structure and Function</td>
<td>18-22%</td>
</tr>
<tr>
<td>Investigating</td>
<td>25-29%</td>
<td>21-25%</td>
<td>Developing and Using Models to Explain Processes</td>
<td>18-22%</td>
</tr>
<tr>
<td>Analyzing, Interpreting, and Computational Thinking</td>
<td>21-25%</td>
<td>25-29%</td>
<td>Analyzing Data and Mathematical Thinking</td>
<td>18-22%</td>
</tr>
<tr>
<td>Explaining Solutions, Reasoning, and Communicating</td>
<td>21-25%</td>
<td>25-29%</td>
<td>Constructing and Communicating an Explanation</td>
<td>18-22%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evaluating Claims with Evidence</td>
<td>18-22%</td>
</tr>
</tbody>
</table>
Performance Tasks

• Provides authentic tasks encouraging complex student engagement
  The task can function as a virtual lab, providing an inquiry-based experience

• Combines both content knowledge and process skills
  Interaction with several pieces of data and analysis tools to arrive at conclusions

• Better assessment of students’ abilities to perform science tasks
  Comprised of several grouped standards, allowing for richer construction
Performance Tasks

Eastern gray squirrels have small ears compared to their body size. Fennec foxes have very large ears compared to their body size. Fennec foxes live in a much warmer climate than gray squirrels. A fennec fox and an eastern gray squirrel are shown in figures 1 and 2.

**Figure 1. Fennec Fox**  
**Figure 2. Eastern Gray Squirrel**

Images are not to scale

Figure 3 gives ear lengths and body lengths in centimeters (cm) for several animals.

**Your Task**

In the questions that follow, you will use the data in Figure 3 and Table 1 to explain why animals with large ears live where they do.

**Task Statement.** The task statement explicitly states the goal of the performance task to the student.

**Stimulus.** Quantitative data and other information that the student needs to perform the task.

**Standards grouping and task description.** The sample performance task groups together three standards: SEPS.4, 4.PS.5, and 4.LS.3. The task description: Analyze data about internal and external structures of organisms to provide evidence of the ways in which these structures transfer energy from place to place in the form of sound, light, heat, or electrical currents.
Performance Tasks

Part A
Select the boxes to match each animal with the size of its ears, using Figure 3.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Smaller Ears</th>
<th>Larger Ears</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Wild Cat</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Arctic Fox</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Jackrabbit</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Fennec Fox</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Eastern Gray Squirrel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part B
Use Table 1 to create a bar graph of the average yearly air temperature of a place where each animal lives. The temperatures where a fennec fox and an eastern gray squirrel live are already graphed for you. Select a point in the graph where the top of each bar should be.

Part B asks students to graph the information from Table 1 in order to be able to observe resulting patterns in the data. The student clicks on the correct area in the graph to create each bar.
Specifications

How are students assessed? What can I expect on ILEARN Science?
Specifications

https://www.doe.in.gov/assessment/ilearn-educators

• Formalizes how items are constructed for each standard
  Evidence statements, content limits, relevant vocabulary, item type

• Sample item
  Provides an example to help item writers come up with ideas and help educators prepare appropriate lesson materials and classroom assessments.

• Identifies accessibility features for item writers
  How will each item be rendered or adapted to reach the largest number of students possible without violating the construct?
### Standard 6.PS.3 — Describe how potential and kinetic energy can be transferred from one form to another.

#### Evidence Statement(s)
Students describe or explain the transfer between different types of kinetic and potential energy.

#### Content Limit(s)/Constraint(s)
Do not assess mechanical energy, conduction, convection, or radiation.

Do not assess light and sound energy.

#### Depth of Knowledge
2

#### Recommended Response Mechanisms (Item Types)
- Multiple Choice (MC)
- Technology-Enhanced (TE)
- Extended Response (ER)
- Constructed Response (CR)
- Simulation (Sim)

#### Context
Context is required.

#### Allowable Stimulus Material
- data tables, graphs, simulation, animation, graphics, text.

#### Construct-Relevant Vocabulary
- kinetic energy, potential energy, heat energy, transfer of energy, conservation of energy, closed system, open system, friction, joule, force, push, pull, transformation of energy, conservation of energy, mass, thermometer, Fahrenheit, Celsius, pendulum, sound energy.

#### Sample Item
A rocket launch is a multi-step process that involves many energy transformations, given in Table 1.

**Table 1. Steps of a Rocket Launch**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>When the rocket engine is turned on, the rocket fuel begins to burn.</td>
</tr>
<tr>
<td>2.</td>
<td>The burning fuel produces gas.</td>
</tr>
<tr>
<td>3.</td>
<td>The gas builds up inside the rocket.</td>
</tr>
<tr>
<td>4.</td>
<td>The gas escapes through the bottom of the rocket, propelling it upward.</td>
</tr>
</tbody>
</table>

During which step of the launch does the energy of the rocket change from potential to kinetic?

- A. Step 1
- B. Step 2
- C. Step 3
- D. Step 4

#### Accessibility and Accommodation Considerations

<table>
<thead>
<tr>
<th>Allowable Tools</th>
<th>N/A</th>
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<tbody>
<tr>
<td>Literacy Considerations</td>
<td>Definitions of construct-irrelevant words may be provided when necessary.</td>
</tr>
<tr>
<td>Visual and Auditory Considerations</td>
<td>Graphics will be provided in formats that are accessible to students with varying abilities, including students who are blind or visually impaired. Graphics should only contain content that will help students understand or process information. Those that do not contribute to the student’s understanding should not be included. Graphics that cannot be brailled will be provided to blind/visually impaired students through a verbal or written description when possible.</td>
</tr>
<tr>
<td>Linguistic Complexity</td>
<td>Rating to be completed after all final edits applied and approved by IDOE.</td>
</tr>
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</table>
### Standard 6.PS.3
Describe how potential and kinetic energy can be transferred from one form to another.

**Evidence Statement(s)**
Students describe or explain the transfer between different types of kinetic and potential energy.

**Content Limit(s)/Constraint(s)**
Do not assess mechanical energy, conduction, convection, or radiation.

Do not assess light and sound energy.

**Depth of Knowledge**
2

**Recommended Response Mechanisms (Item Types)**
Multiple Choice (MC)
Technology-Enhanced (TE)
Extended Response (ER)
Constructed Response (CR)
Simulation (Sim)

**Context**
Context is required.

**Allowable Stimulus Material**
data tables, graphs, simulation, animation, graphics, text.

**Construct-Relevant Vocabulary**
kinetic energy, potential energy, heat energy, transfer of energy, conservation of energy, closed system, open system, friction, joule, force, push, pull, transformation of energy, conservation of energy, mass, thermometer, Fahrenheit, Celsius, pendulum, sound energy.

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**Sample Item**
A rocket launch is a multi-step process that involves many energy transformations, given in Table 1.

**Table 1. Steps of a Rocket Launch**
1. When the rocket engine is turned on, the rocket fuel begins to burn.
2. The burning fuel produces gas.
3. The gas builds up inside the rocket.
4. The gas escapes through the bottom of the rocket, propelling it upward.

During which step of the launch does the energy of the rocket change from potential to kinetic?

A. Step 1  
B. Step 2  
C. Step 3  
D. Step 4

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**Accessibility and Accommodation Considerations**

**Literacy Considerations**
Definitions of construct-irrelevant words may be provided when necessary.

**Visual and Auditory Considerations**
Graphics will be provided in formats that are accessible to students with varying abilities, including students who are blind or visually impaired. Graphics should only contain content that will help students understand or process information. Those that do not contribute to the student's understanding should not be included. Graphics that cannot be brailled will be provided to blind/visually impaired students through a verbal or written description when possible.

**Linguistic Complexity**
Rating to be completed after all final edits applied and approved by IDOE.

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**Indiana Department of Education**
A rocket launch is a multi-step process that involves many energy transformations, given in Table 1.

Table 1. Steps of a Rocket Launch

1. When the rocket engine is turned on, the rocket fuel begins to burn.
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4. The gas escapes through the bottom of the rocket, propelling it upward.

During which step of the launch does the energy of the rocket change from potential to kinetic?

A. Step 1  B. Step 2  C. Step 3  D. Step 4

**Accessibility and Accommodation Considerations**

- **Allowable Tools:** N/A
- **Literacy Considerations:** Definitions of construct-irrelevant words may be provided when necessary.
- **Visual and Auditory Considerations:** Graphics will be provided in formats that are accessible to students with varying abilities, including students who are blind or visually impaired. Graphics should only contain content that will help students understand or process information. Those that do not contribute to the student’s understanding should not be included. Graphics that cannot be brailed will be provided to blind/visually impaired students through a verbal or written description when possible.
- **Linguistic Complexity:** Rating to be completed after all final edits applied and approved by IDOE.
A rocket launch is a multi-step process that involves many energy transformations, given in Table 1.

Table 1. Steps of a Rocket Launch

<table>
<thead>
<tr>
<th>Step</th>
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<td>1.</td>
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6.PS.3 – Describe how potential and kinetic energy can be transferred from one form to another.

Evidence Statement(s)
Students describe or explain the transfer between different types of kinetic and potential energy.

Content Limit(s)/Constraint(s)
Do not assess mechanical energy, conduction, convection, or radiation.

Do not assess light and sound energy.

Depth of Knowledge
2

Recommended Response Mechanisms (Item Types)
Multiple Choice (MC)  Technology-Enhanced (TE)  Extended Response (ER)  Constructed Response  Simulation (Sim)

Context
Context is required.

Allowable Stimulus Material
data tables, graphs, simulation, animation, graphics, text.

Construct-Relevant Vocabulary
kinetic energy, potential energy, heat energy, transfer of energy, conservation of energy, closed system, open system, friction, joule, force, push, pull, transformation of energy, conservation of energy, mass, thermometer, Fahrenheit, Celsius, pendulum, sound energy.

Accessibility and Accommodation Considerations
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Visual and Auditory Considerations
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Sample item conforms to elements in the specification and provides a visual exemplar.
Sample Item

A rocket launch is a multi-step process that involves many energy transformations, given in Table 1.

Table 1. Steps of a Rocket Launch

1. When the rocket engine is turned on, the rocket fuel begins to burn.
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During which step of the launch does the energy of the rocket change from potential to kinetic?

A. Step 1         B. Step 2         C. Step 3  

Allowable Tools  
N/A

Literacy Considerations

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N/A

Linguistic Complexity

Rating to be completed after all final edits applied and approved by IDOE.
Accessibility Framework

• Universal Features
  Available to all students as they access instructional or assessment content

• Designated Features
  Tools that are available to any student for whom the need has been indicated by educators who are familiar with the student’s characteristics and needs.

• Accommodations
  A change in the standardized testing materials or procedures that enables students with a disability or limited English proficiency to participate in an assessment in a way that measures abilities.
Performance Task specification

- **Standard Group**
  *Standards used to create the Performance Task*
- **Phenomenon**
  *A real-world, observable problem*
- **Task**
  *Clearly states what the student must do*
- **Stimulus**
  *Quantitative and other information about the phenomenon*
- **Interactions**
  *Multiple items that require the student to engage with the stimulus material*
ILEARN Resources

• Released Item Repository
• ILEARN Blueprints
• ILEARN Item and Task Specifications
• Updated policies
• Technology specifications/guidance
• More to come!

https://www.doe.in.gov/assessment/ilearn-educators
Contact

Office of Student Assessment: 317-232-9050  |  INassessments@doe.in.gov
Tim Martin, Assessment Content Specialist: tmartin1@doe.in.gov

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