ILEARN Blueprints & Specifications: Biology

#IDOEILEARN

Follow us!
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 Biology?*

• 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.
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

<table>
<thead>
<tr>
<th>Computer Adaptive</th>
<th>Additional Student Supports and Accommodations</th>
<th>Improved Testing Times</th>
<th>Improved Reporting Structures</th>
<th>Technology Setup and Requirements**</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Math and ELA</td>
<td>• Translations</td>
<td>• Single testing window at the end of the year</td>
<td>• Individual student results in 12 days*</td>
<td>• Small IT and bandwidth footprint</td>
</tr>
<tr>
<td>• Unique student experience that always meets the blueprint</td>
<td>• Glossaries</td>
<td>• Decreased test length (average 2 hours shorter total at each grade level)</td>
<td>• Final results by July 1*</td>
<td>• No local caching</td>
</tr>
<tr>
<td>• Adapts on difficulty, not across grade levels unless content aligns at multiple grade levels</td>
<td>• Embedded Dictionary/Thesaurus</td>
<td>• Untimed sessions</td>
<td>• More detailed student reports for computer adaptive tests</td>
<td>• Secure Browser is the only required software</td>
</tr>
<tr>
<td></td>
<td>• Spell Check</td>
<td></td>
<td>• Revised cut scores and proficiency levels (by educator committee)</td>
<td>• Includes diagnostic tools</td>
</tr>
<tr>
<td></td>
<td>• Rich Text Tools</td>
<td></td>
<td></td>
<td>• “Sessionless” testing; no test tickets or seal codes</td>
</tr>
<tr>
<td></td>
<td>• Accessible Calculator</td>
<td></td>
<td></td>
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</tr>
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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 Biology 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></td>
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<td>Min</td>
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</tr>
<tr>
<td>Developing and Using Models to Describe Structure and Function (18–22%)</td>
<td>B.1.1</td>
<td>0</td>
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<tr>
<td></td>
<td>B.1.2</td>
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<td>0</td>
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<tr>
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<td>B.1.5</td>
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ILEARN Biology Blueprint

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**Item range** is the number of items for that standard or category in a given year.
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Percent range is the weight of each standard on the assessment as a whole.
## Comparison of reporting categories

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<thead>
<tr>
<th>ISTEP+ Science Grade 10 Reporting Categories</th>
<th>ILEARN Biology Reporting Categories</th>
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</thead>
<tbody>
<tr>
<td>The Nature of Science</td>
<td>Developing and Using Models to Describe Structure and Function</td>
</tr>
<tr>
<td>Cellular Structure, Chemistry, and Reproduction</td>
<td>Developing and Using Models to Explain Processes</td>
</tr>
<tr>
<td>Matter Cycles, Energy Transfer, and Interdependence</td>
<td>Analyzing Data and Mathematical Thinking</td>
</tr>
<tr>
<td>Genetics, Molecular Basis of Heredity, and Evolution</td>
<td>Constructing and Communicating an Explanation</td>
</tr>
<tr>
<td></td>
<td>Evaluating Claims with Evidence</td>
</tr>
</tbody>
</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

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.

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.

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

Task Statement. The task statement explicitly states the goal of the performance task to the student.
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></td>
<td>X</td>
</tr>
<tr>
<td>Eastern Gray Squirrel</td>
<td>X</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.

Part A is a matching table item that assesses students’ ability to analyze data from the graph in Figure 3. The student clicks on the cells in the table where they want to place a response.
Specifications

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

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

• Formalize 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: B.4.2 – Construct an explanation for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

Evidence Statement(s):
Students explain how the structure of DNA determines the structure of proteins and why proteins are essential to life.

Students explain that DNA consists of small sections called genes which code for proteins (all genes in a particular cell are not expressed).

Students describe the flow of information in the cell from DNA to RNA to proteins.

Content Limit(s)/Constraint(s):
Do not assess the subcomponents of a nucleotide.
Do not assess specific knowledge of errors resulting from any deletions or insertions.
Do not assess specific mechanisms of gene regulation.

Depth of Knowledge: 2

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

Context: Context is required.

Allowable Stimulus Material: data tables, graphs, simulations, animations, graphics, text

Construct-Relevant Vocabulary: cell, nucleus, chromosome, gene, genetic, molecule, protein, DNA, nucleated cell, structure, function, transcription, double helix, adenine, guanine, cytosine, thymine, deoxynucleotide, phosphate, hydrogen bond, RNA, nucleotide, base

Sample Item:
The steps list the processes of protein formation. The steps given are out of order.

A. A ribosome attaches to mRNA.
B. mRNA travels outside the nucleus.
C. A polypeptide is released from the ribosome.
D. An mRNA strand forms from a section of DNA.
E. Ribosomes link amino acids in a chain, according to the order of the bases in mRNA.

Which sequence is the correct order of these steps?

A. A, D, C, B, E
B. D, C, B, A, E
C. A, E, C, B, D
D. D, B, A, E, C

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 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.
Standard: 8.4.2 – Construct an explanation for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

Evidence Statement(s): Students explain how the structure of DNA determines the structure of proteins and why proteins are essential to life.

- Students explain that DNA consists of small sections called genes which code for proteins (all genes in a particular cell are not expressed).
- Students describe the flow of information in the cell from DNA to RNA to proteins.

Content Limit(s)/Constraint(s):
- Do not assess the subcomponents of a nucleotide.
- Do not assess specific knowledge of errors resulting from any deletions or insertions.
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- American Sign Language – N/A for this standard
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Evidence statement identifies how students indicate their mastery of the standard.

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

Context is required.
Biology Specification

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<td>Context</td>
<td>Context is required.</td>
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<td>Allowable Stimulus Material</td>
<td>data tables, graphs, simulations, animations, graphics, text</td>
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<td>Construct-Relevant Vocabulary</td>
<td>cell, nucleus, chromosome, gene, genetic, molecule, protein, DNA, nucleated cell, structure, function, transcription, double helix, guanine, cytosine, thymine, deoxyribose, phosphate, hydrogen bond, RNA, nucleotide, base</td>
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**Sample Item**

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<thead>
<tr>
<th>Standard</th>
<th>8.4.2 – Construct an explanation for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence Statement(s)</td>
<td>Students explain how the structure of DNA determines the structure of proteins and why proteins are essential to life. Students explain that DNA consists of small sections called genes which code for proteins (all genes in a particular cell are not expressed). Students describe the flow of information from DNA to proteins.</td>
</tr>
<tr>
<td>Content Limit(s)/Constraint(s)</td>
<td>Do not assess the subcomponents of a nucleotide. Do not assess specific knowledge of errors resulting from any deletions or insertions. Do not assess specific mechanisms of gene regulation.</td>
</tr>
<tr>
<td>Depth of Knowledge</td>
<td>2</td>
</tr>
<tr>
<td>Recommended Response Mechanisms (Item Types)</td>
<td>Multiple Choice (MC) Technology-Enhanced (TE) Extended Response (ER) Constructed Response (CR)</td>
</tr>
<tr>
<td>Context</td>
<td>Context is required.</td>
</tr>
<tr>
<td>Allowable Stimulus Material</td>
<td>data tables, graphs, simulations, animations, graphics, text</td>
</tr>
<tr>
<td>Construct-Relevant Vocabulary</td>
<td>cell, nucleus, chromosome, gene, genetic, molecule, protein, DNA, nucleated cell, structure, function, transcription, double helix, adenine, guanine, cytosine, thymine, deoxyribose, phosphate, hydrogen bond, RNA, nucleotide, base</td>
</tr>
</tbody>
</table>

Sample Item

The steps list the processes of protein formation. The steps given are out of order.

A. A ribosome attaches to mRNA.
B. mRNA travels outside the nucleus.
C. A polypeptide is released from the ribosome.
D. An mRNA strand forms from a section of DNA.
E. Ribosomes link amino acids in a chain, according to the order of the bases in mRNA.

Which sequence is the correct order of these steps?

A. A, D, C, B, E
B. D, C, B, A, E
C. A, E, C, B, D
D. D, B, A, E, C

Sample item conforms to elements in the specification and provides a visual exemplar.

**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 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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**American Sign Language** – N/A for this standard
Biology Specification

Every standard specification has a section for accessibility requirements and considerations.

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Allowable Tools
N/A

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

Visual and Auditory Considerations
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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.
ILEARN Accessibility Framework

Universal Features: Available to ALL students

- Answer Eliminator
- Calculator for calculator allowed items (Mathematics Grades 6-8)
- Dictionary (Writing) New
- English Glossary for pre-selected construct-irrelevant terms (all content areas) New
- Notepad New
- Highlighter
- Line Reader
- Mark for Review
- Mathematics Tools (e.g. ruler)
- Thesaurus (Writing) New
- Tutorial New
- Writing Tools (e.g. rich text, spell check) New
- Zoom

Embedded/Online

- Color Contrast
- *Translation Glossary (for pre-selected construct-irrelevant term in Spanish, Burmese, Arabic, Mandarin, Vietnamese) all content areas New
- Masking
- Mouse pointer (size and color) New
- Print size (zoom in and out) New
- *Translation-Spanish (Stacked) for Mathematics, Science and Social Studies New

- America Sign Language (ASL) videos for media items New
- Braille transcript for audio items New
- Closed caption for online audio items New
- Refreshable Braille New
- Permissive mode to use assistive technology devices New
- Print on Demand New
- Streamline format New
- Text to speech (except for items testing comprehension

Accommodations: Available to students with an IEP, 504 Plan or Nonpublic Service Plan

- Alternative indication of response
- Braille Booklet
- Computer or other Assistive Technology (AT)
- Extra time
- Calculator for calculator allowed items (Mathematics Grades 6-8) New
- Hundreds Chart (Mathematics Grades 3-8) New
- Interpreter for sign language
- Large Print Booklet
- Multiplication Table (Grades 6-8) New
- Paper Booklet
- Paper Booklet (Spanish Translation) New
- Read aloud to self
- Scan page to print
- Scribe
- Test individually

Non-Embedded

- *Intended for English Learners (EL)

- Assistive technology to magnify/enlarge
- Color Overlay
- Sound amplification system
- Special furniture or equipment for viewing test
- Special lighting conditions
- Time of day for testing altered

Accommodations: Available to students with an ILP (English Learners)

- Extra time
- Read aloud to self
- Test individually
- Approved bilingual word-to-word dictionary

Non-Embedded
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  I  INassessments@doe.in.gov
Tim Martin, Assessment Content Specialist: tmartin1@doe.in.gov

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