



Ohio Academic Standards Addressed By Zoo Program

WINGED WONDERS: SEED DROP

Program description:

Discover whether all seeds fall at the same rate. Do small or big seeds fall more slowly? Students will use inquiry to discover answers to these and other questions.

Ohio Science Standards addressed by this program, organized by grade band and then standard:

GRADES K-2

Standard: Life Sciences

Benchmark A: Discover that there are living things, non-living things and pretend things, and describe the basic needs of living things (organisms).

Indicators:

Kindergarten

1. Explore differences between living and non-living things (e.g., plant-rock)

Benchmark B: Explain how organisms function and interact with their physical environment.

Indicators:

Kindergarten

5. Investigate observable features of plants and animals that help them live in different kinds of places.

Grade 2

6. Investigate the different structures of plants and animals that help them live in different environments (e.g., lungs, gills, leaves and roots).

Standard: Physical Science

Benchmark A: Discover that many objects are made of parts that have different characteristics. Describe these characteristics and recognize ways an object may change.

Indicators:

Kindergarten

2. Examine and describe objects according to the materials that make up the object (e.g., wood, metal, plastic and cloth.)
3. Describe and sort objects by one or more properties (e.g., size color and shape).

Grade 1

1. Classify objects according to the materials they are made of and their physical properties

3. Explore and observe that things can be done to materials to change their properties (e.g., heating, freezing, mixing, cutting, wetting, dissolving, bending and exposing to light.)
4. Explore changes that greatly change the properties of an object (e.g., burning paper) and changes that leave the properties largely unchanged (e.g., tearing paper)

Benchmark B: Recognize that light, sound and objects move in different ways.

Indicators:

Kindergarten

4. Explore that things can be made to move in many different way such as straight, zigzag, up and down, round and round, back and forth, or fast or slow.
5. Investigate ways to change how something is moving (e.g., push, pull)

Grade 1

6. Investigate a variety of ways to make things move and what causes them to change speed, direction and/or stop.

Standard: Science and Technology

Benchmark A: Explain why people, when building or making something, need to determine what it will be made of, how it will affect other people and the environment.

Indicators:

Kindergarten

1. Explore that objects can be sorted as “natural” or “man-made”.
2. Explore that some materials can be used over and over again (e.g., plastic or glass containes, cardboard boxes and tubes).

Grade 1

3. Identify some materials that can be saved for community recycling projects (e.g., newspapers, glass and aluminum.)

Benchmark B: Explain that to construct something requires planning, communication, problem solving and tools.

Indicators:

Kindergarten

3. Explore that each kind of tool has an intended use, which can be helpful or harmful (e.g., scissors can be used to cut paper but they can also hurt you).

Grade 1

2. Explain that when trying to build something or get something to work better, it helps to follow directions and ask someone who has done it before.
6. Investigate that tools are used to help make things and some things cannot be made without tools.
7. Explore that several steps are usually needed to make things (e.g., building with blocks).

Standard: Scientific Inquiry

Benchmark A: Ask a testable question.

Indicators:

Kindergarten

1. Ask “what if” questions.
2. Explore and pursue student-generated “what if” questions

Grade 1

1. Ask “what happens” questions.
2. Explore and pursue student-generated “what happens when” questions

Grade 2

1. Ask “how can I/we” questions
2. Ask “how do you know” questions (not “why” questions) in appropriate situations and attempt to give reasonable answers when others ask questions.
3. Explore and pursue student-generated “how” questions.

Benchmark B: Design and conduct a simple investigation to explore a question.

Indicators:

Kindergarten

3. Use appropriate safety procedures when completing scientific investigations.
7. Use appropriate tools and simple equipment/instruments to safely gather scientific data (e.g., magnifiers and other appropriate tools.)
10. Make new observations when people give different descriptions for the same thing.

Grade 1

3. Use appropriate safety procedures when completing scientific investigations.
6. Use appropriate tools and simple equipment/instruments to safely gather scientific data (e.g., magnifiers, timers and simple balances and other appropriate tools).

Grade 2

4. Use appropriate safety procedures when completing scientific investigations.
7. Use appropriate tools and simple equipment/instruments to safely gather scientific data (e.g., magnifiers, non-breakable thermometers, timers, rulers, balances and calculators and other appropriate tools).

Benchmark C: Gather and communicate information from careful observations and simple investigation through a variety of methods.

Indicators:

Kindergarten

6. Recognize that numbers can be used to count a collection of things.

Grade 1

4. Work in a small group to complete an investigation and then share findings with others.
5. Create individual conclusions about group findings.

7. Make estimates to compare familiar lengths, weights and time intervals.
8. Use oral, written and pictorial representation to communicate work.
9. Describe things as accurately as possible and compare with the observations of others.

Grade 2

5. Use evidence to develop explanations of scientific investigations. (What do you think? How do you know?)
6. Recognize that explanations are generated in response to observations, events and phenomena.
9. Use whole numbers to order, count, identify, measure and describe things and experiences.
10. Share explanations with others to provide opportunities to ask questions, examine evidence and suggest alternative explanations.

Standard: Scientific Ways of Knowing

Benchmark A: Recognize that there are different ways to carry out scientific investigations. Realize that investigations can be repeated under the same conditions with similar results and may have different explanations.

Indicators:

Kindergarten

1. Recognize that scientific investigations involve asking open-ended questions. (How? What if?)
2. Recognize that people are more likely to accept your ideas if you can give good reasons for them.

Grade 1

1. Discover that when a science investigation is done the same way multiple times, one can expect to get very similar results each time it is performed.
2. Demonstrate good explanations based on evidence from investigations and observations.

Grade 2

1. Describe that scientific investigations generally work the same way under the same conditions.

Benchmark B: Recognize the importance of respect for all living things.

Indicators:

Kindergarten

3. Interact with living things and the environment in ways that promote respect.

Benchmark C: Recognize that diverse groups of people contribute to our understanding of the natural world.

Indicators:

Kindergarten

4. Demonstrate ways science is practiced by people everyday (children and adults)

Grade 1

3. Explain that everybody can do science, invent things and have scientific ideas no matter where they live.

Grade 2

2. Explain why scientists review and ask questions about the results of other scientists' work.
 4. Demonstrate that in science it is helpful to work with a team and share findings with others.
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GRADES 3-5

Standard: Life Sciences

Benchmark B: Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive.

Indicators:

Grade 4

3. Classify common plants according to their characteristics (e.g., tree leaves, flowers, seeds, roots and stems.)

Standard: Physical Sciences

Benchmarks B: Identify and describe the physical properties of matter in its various states.

Indicators:

Grade 4

3. Describe objects by the properties of the materials from which they are made and that these properties can be used to separate or sort a group of objects (e.g., paper, glass, plastic and metal.)

Benchmark C: Describe the forces that directly affect objects and their motion.

Indicators:

Grade 3

2. Describe an object's motion by tracing and measuring its position over time.
3. Identify contact/noncontact forces that affect motion of an object (e.g., gravity, magnetism and collision).
4. Predict the changes when an object experiences a force (e.g., a push or pull, weight or friction).

Standard: Scientific Inquiry

Benchmark A: Use appropriate instruments safely to observe, measure and collect data when conducting a scientific investigation.

Indicators:

Grade 5

1. Select and safely use the appropriate tools to collect data when conducting investigations and communicating findings to others (e.g., thermometers, timers, balances, spring scales, magnifiers, microscopes and other appropriate tools).

Benchmark B: Organize and evaluate observations, measurements and other data to formulate inferences and conclusions.

Indicators:

Grade 3

2. Discuss observations and measurements made by other people.
3. Read and interpret simple tables and graphs produced by self/others.

4. Record and organize observations (e.g., journals, charts and tables).

Grade 4

2. Analyze a series of events and/or simple daily or seasonal cycles, describe the patterns and infer the next likely occurrence.

Grade 5

2. Evaluate observations and measurements made by other people and identify reasons for any discrepancies.
3. Use evidence and observations to explain and communicate the results of investigations.

Benchmark C: Develop, design and safely conduct scientific investigations and communicate the results.

Indicators:

Grade 3

4. Identify and apply science safety procedures.
6. Communicate scientific findings to others through a variety of methods (e.g., pictures, written, oral and recorded observations).

Grade 4

4. Explain the importance of keeping conditions the same in an experiment.
5. Describe how comparisons may not be fair when some conditions are not kept the same between experiments.
6. Formulate instructions and communicate data in a manner that allows others to understand and repeat an investigation or experiment.

Standard: Scientific Ways of Knowing

Benchmark A: Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained.

Indicators:

Grade 5

1. Summarize how conclusions and ideas change as new knowledge is gained.

Benchmark B: Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions.

Indicators:

Grade 4

3. Explain discrepancies in an investigation using evidence to support findings.

Grade 5

3. Explain why an experiment must be repeated by different people or at different times or places and yield consistent results before the results are accepted.
4. Identify how scientists use different kinds of ongoing investigations depending on the questions they are trying to answer (e.g., observations of things or events in nature, data collection and controlled experiments).

Benchmark C: Explain the importance of keeping records of observations and investigations that are accurate and understandable.

Indicators:

Grade 3

2. Keep records of investigations and observations and do not change the records that are different from someone else's work.

Grade 4

2. Record the results and data from an investigation and make a reasonable explanation.
4. Explain why keeping records of observations and investigations is important.

Grade 5

5. Keep records of investigations and observations that are understandable weeks or months later.

GRADES 6-8**Standard:** Life Sciences

Benchmark A: Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures.

Indicators:

Grade 7

1. Investigate the great variety of body plans and internal structures found in multicellular organisms.

Benchmark B: Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species.

Indicators:

Grade 7

8. Investigate the great diversity among organisms.

Grade 8

3. Explain how variations in structure, behavior or physiology allow some organisms to enhance their reproductive success and survival in a particular environment.

Standard: Physical Science

Benchmark B: In simple cases, describe the motion of objects and conceptually describe the effects of forces on an object.

Indicators:

Grade 8

1. Describe how the change in the position (motion) of an object is always judged and described in comparison to a reference point.
2. Explain that motion describes the change in the position of an object (characterized by a speed and direction) as time changes.

Standard: Science and Technology

Benchmark B: Design a solution or product taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety and aesthetics).

Indicators:

Grade 8

4. Evaluate the overall effectiveness of a product design or solution.

Standard: Scientific Inquiry

Benchmark A: Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools.

Indicators:

Grade 6

1. Explain that there are not fixed procedures for guiding scientific investigations; however, the nature of an investigation determines the procedures needed.
2. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations.

Grade 7

1. Explain that variables and controls can affect the results of an investigation and that ideally one variable should be tested at a time; however it is not always possible to control all variables.
2. Identify simple independent and dependent variables.
4. Choose the appropriate tools and instruments and use relevant safety procedures to complete scientific investigations.

Grade 8

3. Read, construct and interpret data in various forms produced by self and others in both written and oral form (e.g., tables, charts, maps, graphs, diagrams and symbols).

Standard: Scientific Ways of Knowing

Benchmark A: Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation).

Indicators:

Grade 6

2. Describe why it is important to keep clear, thorough and accurate records.

Grade 8

1. Identify the difference between description (e.g., observation and summary) and explanation (e.g., inference, prediction, significance and importance).

Benchmark B: Explain the importance of reproducibility and reduction of bias in scientific methods.

Indicators:

Grade 7

1. Show that the reproducibility of results is essential to reduce bias in scientific investigations.
2. Describe how repetition of an experiment may reduce bias.

Grade 8

2. Explain why it is important to examine data objectively and not let bias affect observations.