

8TH GRADE SCIENCE CHECKLIST
Goals 11 – 13
Illinois Learning Standards A – F
Performance Descriptors

SCIENTIFIC INQUIRY

- _____ Formulate hypotheses that can be tested by collecting data through:
 - _____ Summarize an outcome in a hypothesis statement
 - _____ Formulating a hypothesis that includes a variable to be tested and a variable to be observed/measured
 - _____ Formulating a hypothesis using an if-then, cause-effect statement
 - _____ Predict an outcome in a hypothesis statement
- _____ Design scientific experiments that control all but one variable by:
 - _____ Summarizing independent/manipulated and dependent/responding variables of a scientific experiment
 - _____ Designing and discussing variables that are kept the same (control) in order to give a “fair” test
 - _____ Conducting and analyzing several trials of an experiment
- _____ Collect and record data accurately using consistent measuring and recording techniques and media by:
 - _____ Using appropriate units of measurement consistently
 - _____ Selecting appropriate instruments for gathering data
 - _____ Reading data from collecting instruments and recording accurately
 - _____ Organizing data in a table, chart or other appropriate format
- _____ Use data manipulation tools and quantitative and representational methods to analyze measurements by:
 - _____ Analyzing data using data manipulation tools
 - _____ Graphing data appropriately to show relation to variables in hypothesis

_____ Explain the existence of unexpected results in a data set by:

- _____ Comparing individual results with group results
- _____ Summarizing unexpected data within the data set
- _____ Analyzing discrepancies in the data set

_____ Interpret and represent results of analysis to produce findings by:

- _____ Comparing and discussing observations that support a hypothesis
- _____ Inferring results based on data to produce findings or conclusions

_____ Report and display the process and results of a scientific investigation by:

- _____ Discussing and analyzing the process and results of an investigation in an oral and /or written presentation
- _____ Deciding whether observations support a hypothesis
- _____ Constructing a logical proof or explanation of findings
- _____ Report results of an investigation using posters, pictures, actual materials, computer graphs, or multi-media
- _____ Choosing questions for further investigation

TECHNOLOGICAL DESIGN

_____ Identify an actual design problem and establish criteria for determining the success of a solution by:

- _____ Recommending a specific need or problem
- _____ Designing and evaluating a chart/table indicating the criteria for determining a successful solution

_____ Sketch, propose, and compare design solutions to the problem considering available materials, tools, cost effectiveness, and safety by:

- _____ Investigating, selecting possible design solutions to a problem
- _____ Comparing the best design solutions based on constraints such as time, cost, tradeoffs, materials and safety

_____ Select the most appropriate design and build a prototype or simulation by:

- _____ Analyzing the most appropriate design that solves a problem, satisfies design constraints, and meets established criteria for success.
- _____ Selecting appropriate materials for a design
- _____ Constructing a prototype, model or simulation
- _____ Test the prototype using available materials, instruments, and technology and recording of the data by:
 - _____ Using appropriate strategies such as simulation and trial and error methods to test a model
 - _____ Test a model using criteria developed to determine a successful solution of a problem
 - _____ Record data accurately over multiple trials
- _____ Evaluate the test results based on established criteria, note sources of error, and recommend improvements by:
 - _____ Evaluating test results by established test criteria
 - _____ Critiquing results of a test to locate sources of error
 - _____ Listing suggestions for redesigning the test to improve results
- _____ Use available technology to report the relative success of their design, based upon the test results and their testing criteria by:
 - _____ Prepares a report of a test design, procedure, and results using available technology
 - _____ Sharing the technology-based report of the test results and testing criteria in a small and large group setting

LIVING THINGS

- _____ Know how cells function as “building blocks” of organisms and describe the requirements for cells to live by:
 - _____ Investigating and discussing examples of how cells work together to keep the organism alive
 - _____ Analyzing the many functions cells carry on to sustain life
 - _____ Investigating how specialized cells perform specialized functions in multi-cellular organisms
- _____ Know the characteristics of organisms produced from a single parent with those of organisms produced by 2 parents (sexual).

- _____ Compare and contrast asexual and sexual reproduction
- _____ Differentiate between the characteristics of organisms produced by a single parent / by 2 parents
- _____ Summarize how every organism requires a set of instructions for specifying its traits
- _____ Know how different forms and structures reflect different functions by:
 - _____ Analyze the functions of various animal parts such as elephant tusks or feathers on birds to their functions
 - _____ Investigate how the functions of plant and animal cells are related to their forms and structures
 - _____ Discuss how changes in form and structure are related to adaptations to changes in the environment and report them
- _____ Know the methods used to identify and classify the biotic and abiotic factors that affect organisms in an environment by studying a local habitat (prairie, forest, school lawn, etc.) and:
 - _____ Analyze biotic and abiotic data in a habitat
 - _____ Choose proper tools, classification keys/guides or other aids to measure or identify biotic or abiotic factors in a local habitat
 - _____ Draw and discuss a food pyramid for a local habitat
 - _____ Design a sample chart that lists different niches and relationships found among organisms and a local habitat
- _____ Know the competitive, adaptive, and survival potential of an organism's characteristics by:
 - _____ Predict the characteristics an organism would have in a given environment
 - _____ Describe how characteristic features of plants and animals help them survive in the environment (mosquitoes piercing mouth parts)

MATTER AND ENERGY

- _____ Know the interactions of energy with matter by:
 - _____ Designing investigations that demonstrate how interactions of energy and matter affect changes of state
 - _____ Discussing how energy interacts with matter to conserve mass and energy

_____ Discussing how different types of energy are transformed in various situations

_____ Know the chemical and physical characteristics of matter by:

_____ Investigating and discussing physical and chemical changes of matter

_____ Investigating and discussing the relationships among atoms, molecules, elements and compounds

_____ Constructing and discussing models or illustrations that show the chemical and physical characteristics of matter

FORCE AND MOTION

_____ Know how forces affect motion by:

_____ Demonstrating and discussing how various forces affect motion

_____ Demonstrating and discussing Newton's Laws of Motion

_____ Demonstrating and evaluating how gravity is affected by an object's size and its distance from other objects

_____ Know factors that affect the gravitational forces on objects:

_____ Investigating and discussing factors that affect the gravitational forces on an object

_____ Experimenting and discussing how gravity is affected by an object's size and its distance from other objects

_____ Know the large-scale dynamic forces, events and processes that affect Earth's land, water and atmospheric systems by:

_____ Forecasting and summarizing, from current data, local atmospheric conditions for an extended period of time

_____ Analyze glacially produced features of Illinois

_____ Know interactions among solid earth, oceans, atmosphere, and organisms that have resulted in ongoing changes of the Earth by:

_____ Summarizing the implications of ongoing changes to the Earth's atmosphere (e.g., global warming)

_____ Investigating about how organisms can cause changes to the Earth

- _____ Discussing a current issue where humans have caused changes to the Earth (the current state and implications of the destruction of the rain forests)
- _____ Know how to evaluate the biodegradability of materials that are produced with or made of natural and /or synthetic substances by:
 - _____ Experimenting with and summarizing the biodegradability of various natural resources
 - _____ Reporting and discussing the results of their tests on the biodegradability of various natural resources
- _____ Know the effects of gravitational force in the solar system (e.g., orbital shape and speed, tides, spherical shape of the planets and moons) by:
 - _____ Comparing the gravity of each planet
 - _____ Comparing the orbital shapes of the planets
 - _____ Discussing the effects of the sun and moon's gravity on the tides
- _____ Know the organization and physical characteristics of the solar system by:
 - _____ Construct a scale model of the solar system to compare the relative sizes and distances of the planets
 - _____ Comparing and contrasting the surface and atmospheric conditions of each planet
 - _____ Classifying the planet's characteristics based on size and composition
 - _____ Compare the orbits of comets and planets

SCIENCE PRACTICES

- _____ Indicate knowledge of potential hazards in science activities by:
 - _____ Formulating and practicing safety rules during lab experiments
 - _____ Handle equipment appropriately and safely
 - _____ Clean up workspaces and return equipment to the proper locations
 - _____ Dispose of waste materials properly
- _____ Analyze cases in which the work of science has been effected by both valid and biased scientific practices by:

_____ Researching, comparing and reporting scientific works that have been affected by both valid and biased practices

_____ Know the similarities and differences between observational and experimental investigations by:

_____ Differentiating why more than one possible conclusion can be drawn from observational and experimental phenomenon

_____ Comparing and contrasting the scientific methods for conducting observational and experimental investigations

SCIENCE, TECHNOLOGY, AND SOCIETY

_____ Know ways that scientific knowledge and economics drive technological development by:

_____ Discussing how a need can lead to a technological advancement

_____ Evaluating how a design leads to many uses

_____ Know important contributions to science and technology that have been made by individuals and groups from various cultures by:

_____ Reporting contributions to science and technology made by women, cultural and ethnic minorities and persons with disabilities

_____ Evaluating contributions made to science and technology by persons from various cultures

_____ Know how occupations use scientific and technological knowledge and skills by:

_____ Summarizing and appraising a variety of career choices and their relationships to science and technology

_____ Know the interaction of resource acquisition, technological development, and ecosystem impact by:

_____ Critiquing local land developments and their impact on an ecosystem

_____ Evaluating how resources, such as oil, are obtained and what affect this has on the environment

_____ Know advantages and disadvantages of natural resource conservation and management programs by:

_____ Analyzing and predicting the effects of conservation and management practices

_____ Know classroom-developed criteria to determine the effects of policies on local science and technology issues by:

_____ Analyzing and predicting the effectiveness of local policies with classroom developed criteria