2026 FIRST FLIGHT EDUCATIONAL STANDARDS for "LIGHT THE LAMP!"

****Please note that the workbook lessons listed below are still in development. There is a chance they may be altered for the final/printed workbook.****

Theme: There's nothing more exciting in a hockey game than when an Anaheim Ducks player scores a goal. It activates an intense red goal light and a loud foghorn, creating an electrifying atmosphere for Ducks fans. We call it "lighting the lamp". However, knowing how to "Light the Lamp" takes more than the skills of scoring. It takes the understanding of **electricity**, **engineering,** and **circuit design** to switch on this awesome event. We're excited to have you join us as we "Light the Lamp" during the Anaheim Ducks 2026 First Flight Field Trip!

Workbook Summary: The First Flight Field Trip workbook will take students through a five lesson journey to understand the importance of electricity, how it works, and its impact on us, even at an Anaheim Ducks game. The first lessons will set the stage for the field trip theme by explaining the origins of the hockey term, "Light the Lamp". In addition, students will gain learn the many ways electricity is used around them, its impact to society, and the engineers who are able to "control" it for our benefit. The final lessons will discuss the concepts of electricity and circuit design. Students will use these foundational concepts when they are given the task of assembling a simple circuit out of the components (battery, switch, light, and speaker) found in the "Light the Lamp" kit.*

**The Light the Lamp Kit will be sent to public and private school classrooms only. It will be included with their shipment of workbooks.*

Light the Lamp Challenge: At the conclusion of the workbook, students will be challenged to take their "Light the Lamp" circuit a step further. What ideas will your classroom come up with to enhance this circuit? Are there features or improvements that can help NHL arenas "Light the Lamp"? These ideas can be developed in many different ways. Students can draw circuit diagrams, assemble a circuit using actual components. Whichever method you use to "Light the Lamp", we encourage you to share your classroom's creative design for everyone to see!

Science and Engineering Practices ("Habits of Mind"): The use of technology provides many challenges to both students and teachers due to the diversity of educational standards, experience with computers, and access to technology. However, we believe this curriculum will offer tremendous educational benefit to students. It was written specifically to align with the newly adopted Next Generation Science Standards, STEAM (science, technology, engineering, arts, and math) principles, and the previous Science Content Standards for California. This field trip will lean heavily on scientific and engineering practices, also known as "habits of mind" (see Appendix A). Students will be placed

in situations where they will use the same strategies as an engineer or scientist to answer (or even ask) the essential questions posed by the First Flight Field Trip theme and engage in the disciplinary core ideas covered in each lesson.

2026 FIRST FLIGHT FIELD TRIP WORKBOOK LESSONS

LESSON #1: "LIGHT THE LAMP"

Objective: This lesson will take students through a brief introduction of hockey and explain the hockey term, "Light the Lamp". This is the event that occurs after a goal is scored by the Anaheim Ducks at Honda Center. How does the red light and horn signifying a Ducks goal turn on? It doesn't occur automatically. Students will learn that it takes more than shooting a rubber disc into a 4'x6' goal to "Light the Lamp". It takes the understanding of electricity, circuits, and the thought process of an electrical engineer. The engineering design process is a skill that anyone, including elementary school students, can use to accomplish any task!

Educational Topics Covered:

- Definition of electricity and energy
- Natural sources of energy and electricity – lightning, static electricity (by friction, induction, or conduction), biology (nervous system), etc.
- Impact of electricity on everyday life and environment
- The role of an engineer, types of electrical engineers, and the engineering design process as a model for problem solving
- Safety around electricity

LESSON #2: "HOCKEY IS ELECTRIC!"

Objective: This lesson will explore the concept of electricity. Electricity (electrical energy) is a form of energy that utilizes the movement of electrons to do work. In order to understand where electricity comes from, students will learn about an atom and the particles that form it called electrons, protons, and neutrons. Finally, we will use different magnetism and static electricity activities to build up to the concept of continuous electricity, the type of electricity used to power things such as the lights in our homes and at Honda Center.

Educational Topics Covered:

- Atom structure (electrons, protons, and neutrons) and charge (energy)
- An electron's role in electricity
- Magnetism (interaction between positive and negative charge)
- Positively charged atom vs. negatively charged atom
- Static Electricity and Continuous Electricity

LESSON #3: Circuits, conductors, and insulators.

Objective: This lesson will teach students about circuits and the functionality of a switch. A circuit is the "place" where an electron can flow continuously. Creating a circuit involves using conductors, a material that gives electrons the ability to flow freely, and then forming this material into a closed loop. Circuits can be classified as closed (no break) or open (broken). When a circuit is broken, it

means that there is a physical gap in the conductive material preventing the flow of electrons from traveling around the loop. A switch is an electronic component used to open or close a circuit intentionally. The most common switch we use is the one that turns a light on (closed circuit) or off (open/broken).

Educational Topics Covered:

- Circuit structure – open and closed
- The circuit's role for electrons
- Conductors vs. insulators

LESSON #4: "THE STARTING LINE UP"

Objective: Students will learn that electric components are the important "players" within a circuit. These "players" can be very diverse. Each one has a special ability to perform a different task with the electrons that are passed to it. Some components can start flow of electrons (battery). Others can convert electricity into other forms of energy such as light, sound, movement, and heat. This is the conservation of energy at work. Hockey players in a hockey rink behave very much like electric components. They too can be very diverse. Each Anaheim Ducks player has a special ability to perform a different task with the puck that's passed to them. Some players are great at stickhandling. Others are passers or scorers. Choosing the right "players" is important for both applications; whether it's to build the next big thing in technology or a Stanley Cup contending team like the Anaheim Ducks.

Educational Topics Covered:

- Conservation of energy
- Concept of work relating to a circuit – using electric components to covert electrical energy to other types of energy
- In-depth discussion of specific electric components (battery, light, and speaker)
- Battery science

LESSON #5: "DRAWING UP A PLAY"

Objective: This lesson will teach students the process of creating a circuit on paper (circuit diagram) before connecting the actual components for the "Light the Lamp" circuit. This task is similar to drawing up a play in hockey. A coach uses a visual diagram to show where their players should be positioned and how the puck should move between them. Quite often, a goal is scored or a great defensive play occurs when a drawn up play is executed correctly. When it comes to electricity, electrical engineers can also draw up a play. A circuit diagram is a picture that shows where components should be placed and how electricity should flow through them. A fully functioning circuit is created when its circuit diagram is assembled correctly. Students will learn how to use series and parallel circuit structures in their circuit diagram before connecting the components found in the "Light the Lamp" kit.

Educational Topics Covered:

- Drawing a circuit diagram
- Differences between parallel and series circuits

- Engineering/testing a circuit by connecting various electric components and observing the result

2026 FIRST FLIGHT FIELD TRIP EDUCATION STANDARDS

NEXT GENERATION SCIENCE STANDARDS

The workbook relates to the following Next Generation Science Standards that were adopted by the California Department of Education (CDE) in 2013.

Grade 3

3-PS2 Motion and Stability: Forces and Interactions

3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.

3-ESS2 Earth's Systems

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

Grade 4

4-PS3 Energy

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another

4-PS4 Waves and their Applications in Technologies for Information Transfer

4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.

4-LS1 From Molecules to Organisms: Structures and Processes

4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

4-ESS3 Earth and Human Activity

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans

Grade 5

5-PS1 Matter and Its Interactions

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.
5-PS1-3. Make observations and measurements to identify materials based on their properties.
5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

5-PS2 Motion and Stability: Forces and Interactions

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

5-ESS3 Earth and Human Activity

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3-5-ETS1 Engineering Design

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

COMMON CORE MATHEMATICS STANDARDS

Grade 3

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The CCSS for Mathematical Practice describe ways in which students of mathematics ought to engage with the subject matter as they grow in mathematical maturity and expertise. For a complete description of the eight Standards for Mathematical Practice, see Appendix B.

Grade 4

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.

6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
The CCSS for Mathematical Practice describe ways in which students of mathematics ought to engage with the subject matter as they grow in mathematical maturity and expertise. For a complete description of the eight Standards for Mathematical Practice, see Appendix B.

Grade 5

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The CCSS for Mathematical Practice describe ways in which students of mathematics ought to engage with the subject matter as they grow in mathematical maturity and expertise. For a complete description of the eight Standards for Mathematical Practice, see Appendix B.

Grade 6

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The CCSS for Mathematical Practice describe ways in which students of mathematics ought to engage with the subject matter as they grow in mathematical maturity and expertise. For a complete description of the eight Standards for Mathematical Practice, see Appendix B.

SCIENCE CONTENT STANDARDS FOR CALIFORNIA

The workbook relates to the following Science Content Standards for California (pre-NGSS)

Grade 3

Physical Sciences (Energy and Matter)

1.0 Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept:

1.a. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.
1.b. Students know sources of stored energy take many forms such as food, fuel, and batteries.
1.c. Students know machines and living things convert stored energy to motion and heat.

1.h. Students know all matter is made of small particles called atoms, too small to see with the naked eye.
1.i. Students know people once thought that earth, wind, fire, and water were the basic elements that made up all matter. Science experiments show that there are more than 100 different types of atoms, which are presented on the periodic table of the elements.

4.0 Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept:
4.d. Students know that Earth is one of several planets that orbit the Sun and that the Moon orbits Earth.

Investigation and Experimentation
5.0 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
5.a. Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.
5.b. Differentiate evidence from opinion and know that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.
5.c Use numerical data in describing and comparing objects, events, and measurements.
5.d. Predict the outcome of a simple investigation and compare the result with the prediction.
5.e. Collect data in an investigation and analyze those data to develop a logical conclusion.

Grade 4

Physical Sciences
1.0 Electricity and magnetism are related effects that have many useful applications in everyday life. As a basis for understanding this concept:
1.a. Students know how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.
1.b. Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.
1.c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.
1.d. Students know the role of electromagnets in the construction of electric motors, electric generators, and simple devices, such as doorbells and earphones.
1.e. Students know electrically charged objects attract or repel each other.
1.f. Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.
1.g. Students know electrical energy can be converted to heat, light, and motion.

Investigation and Experimentation
6.0 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the

other three strands, students should develop their own questions and perform investigations. Students will:
6.a. Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.
6.c. Formulate and justify predictions based on cause-and-effect relationships.
6.d. Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.
6.e. Construct and interpret graphs from measurements.
6.f. Follow a set of written instructions for a scientific investigation.

Grade 5

Physical Sciences

1.0 Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept
1.a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.
1.b. Students know all matter is made of atoms, which may combine to form molecules.
1.c. Students know metals have properties in common, such as high electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), and gold (Au), are pure elements; others, such as steel and brass, are composed of a combination of elemental metals.
1.d. Students know that each element is made of one kind of atom and that the elements are organized in the periodic table by their chemical properties.

5.0 The solar system consists of planets and other bodies that orbit the Sun in predictable paths. As a basis for understanding this concept:
5.c. Students know the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.

Investigation and Experimentation

6.0 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
6.b. Develop a testable question.
6.c. Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.
6.d. Identify the dependent and controlled variables in an investigation.
6.e. Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.
6.f. Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.
6.g. Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.
6.h. Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

6.i. Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.

Grade 6

Heat (Thermal Energy) (Physical Sciences)

3.0 Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:

3.a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.

3.b. Students know that when fuel is consumed, most of the energy released becomes heat energy.

3.c. Students know heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).

3.d. Students know heat energy is also transferred between objects by radiation (radiation can travel through space).

Resources

6.0 Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:

6.c. Students know the natural origin of the materials used to make common objects.

Investigation and Experimentation

7.0 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

7.a. Develop a hypothesis.

7.b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

7.c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

7.d. Communicate the steps and results from an investigation in written reports and oral presentations.

7.e. Recognize whether evidence is consistent with a proposed explanation.

7.f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.

7.g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).

7.h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).

2025 First Flight Field Trip: Appendix A

Scientific and Engineering Practices	
Asking Questions & Defining Problems	
A basic practice of the **scientist** is the ability to formulate empirically answerable questions about phenomena to establish what is already known, and to determine what questions have yet to be satisfactorily answered.	**Engineering** begins with a problems that needs to be solved, such as "How can we reduce the nation's dependence on fossil fuels?" or "What can be done to reduce a particular disease?" or "How can we improve the fuel efficiency of automobiles?"
Developing & Using Models	
Science often involves the construction of models and simulations to help develop explanations about natural phenomena.	**Engineering** makes use of models and simulations to analyze systems to identify flaws that might occur or to test possible solutions to a new problem.
Planning & Carrying Out Investigations	
A major practice of **scientists** is planning and carrying out systematic scientific investigations that require identifying variables and clarifying what counts as data.	**Engineering** investigations are conducted to gain data essential for specifying criteria or parameters and to test propose designs.
Analyzing & Interpreting Data	
Scientific investigations produce data that must be analyzed to derive meaning. Scientists use a range of tools to identify significant features and patterns in data.	**Engineering** investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria.
Using Mathematics, Information and Computer Technology, and Computations Thinking	
In **science**, mathematics and computation are fundamental tools for representing physical variables and their relationships.	In **engineering**, mathematical and computational representations of established relationships and principles are an integral part of the design process.
Constructing Explanations & Designing Solutions	
The goal of **science** is the construction of theories that provide explanatory accounts of the material world.	The goal of **engineering** design is a systematic approach to solving engineering problems that is based on scientific knowledge and models of the material world.
Engaging in Argument From Evidence	
In **science**, reasoning and argument are essential for clarifying strengths and weaknesses of a line of evidence and for identifying the best explanation for a natural phenomenon.	In **engineering**, reasoning and argument are essential for finding the best solution to a problem. Engineers collaborate with their peers throughout the design process.
Obtaining, Evaluating, and Communicating Information	
Science cannot advance if scientists are unable to communicate their findings clearly and persuasively or learn from the finding of others.	**Engineering** cannot produce new or improved technologies if the advantages of their deigns are not communicated clearly and persuasively.

This chart is from the NSTA Reader's Guide to A Framework for K-12 Science Education:
Practices, Crosscutting Concepts, and Core Ideas
Author: Harold Pratt
The guide can be downloaded as a free e-book
PLEASE NOTE: For in-depth study of the "practices" go to Chapter Three in the Framework