Design Thinking/Technology/Career Readiness/Life Skills-KDG

Introduction to Design and Technology	Time: September-June	Standards:
Essential Questions **Intro. to Design and Technology** ● What does engineering and technology mean to you? ● What can a computer and the Internet help you to do? ● How can a computer and the Internet be used for educational purposes? ● What are some basic computer applications and programs and what do they help me do? **The Designed World** ● What is an engineer and what do engineers do to help our communities and lives? ● What are tools and how are they used to help us with our daily lives and specific tasks? ● How do building materials affect a design? ● How do people design things and what may be some tools and skills they need in order to engage in design? ● How have technology, inventions, and innovations influenced society and history? **Introduction to Habitats/Design in the Natural World** ● What are the human-made and natural worlds and how do they differ? ● What may be some necessary aspects of an animal's habitat? ● What is the purpose of a shelter? ● How does an animal adapt to its habitat? ● How do humans influence an animal's habitat? ● How do people navigate through a virtual environment?	**Enduring Understandings** ● I can independently turn on and off a computer. ● I can log in to a general account independently. ● I can use the mouse and keyboard commands to navigate and utilize a computer program or application. ● I can identify the steps of the Engineering Design Process. ● I can utilize the Engineering design process to solve a problem. ● I can build the tower as part of the Tallest Tower Design Challenge. ● I can identify everyday items or tools that have been invented through history to solve problems. ● I can compare animal and human needs. ● I can match a habitat to an animal. ● I can design a habitat for a specific animal. ● I can research the needs of a Bluebird and design a nest based on those needs. ● I can identify ways that engineers learn from animal engineers.	8.2.2.ED.1: Communicate the function of a product and its value. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process 8.2.2.ITH.2: Explain the purpose of a product and its value. 8.2.2.ITH.3: Identify how technology impacts or improves life. 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. 8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution. 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool. 9.4.2.TL.2: Create a document using a word processing application. 9.4.2.TL.3: ENter information into a spreadsheet and sort information. 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults. 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives. 9.4.2.CI.2: Demonstrate originality and inventiveness in work. 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem. 9.4.2.CT.2: Identify possible approaches and resources to execute a plan. 9.4.2.CT.3: Use a variety of types of thinking to solve problems.

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- How has biomimicry helped humans meet different needs?

Animal Engineers

- What are the essential needs of animals?
- What are the essential needs of birds in their habitats?
- How and why do birds build nests?
- How does the bird habitat provide the basic needs of birds?
- How do animals solve problems?
- What are constraints an animal might encounter?
- How do animals meet their specifications?
- What can we learn from observing birds build nests?

Benchmark Assessment(s)

➤ SWBAT Design a Habitat Challenge-Students are challenged to create their own creature and design a habitat that meets all of the creature's needs.

➤ SWBAT Build a Bird's Nest Challenge-Students learn how birds are examples of animal engineers who design and construct their own nests from various materials they find in nature. Students then design and build their own nests, modeling birds as engineers.

Other Assessments

✔ Teacher observation
✔ Class discussions and group work

Materials

- Building/Modeling Materials:
- Crayons
- Pencils
- Stickers for CTRL+ALT+DELETE on keyboard.
- Cubes
- Blocks
- Knex
- Tape
- Paper Plates
- Tin Foil
- Popsicle/Craft Sticks
- Plastic Cups
- Paper Towel Rolls
- Clay
- Construction Paper

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- Pipe Cleaners
- Straws
- Toothpicks
- Cotton Balls
- Plastic Spoons/Forks
- Index Cards
- Cardboard

SUGGESTED ACTIVITIES

- Engineering is Elementary (Museum of Science, Boston)
- Google Apps for Littles by Christine Pinto & Alice Keeler
- ABCya (computer mouse/keyboard navigation games and activities)
- Introduce Flexible Seating Information
- Introduce rules for the STEM Classroom
- Solve Problems: Be an Engineer! Video
- Read Rosie Revere Engineer by Andrea Beaty
- Read Iggy Peck Architect by Andrea Beaty
- Introduction to Chromebooks/Ipads
- Make a Pumpkin Mouse Control Game
- Cup Stacking Mouse Control Game
- Mouse Control Game
- Make a Face Mouse Control Game
- Google Drawing Practice Activity
- Bear on Deserted Island Video
- Needs of an Animal Song
- Design Challenge Self-Assessment
- Read What to Do with a Box by Jane Yolen

REINFORCEMENT

- Extra practice on devices.
- Pair students with a partner.
- Repeat activities, as needed.

ENRICHMENT

- Complete the Rosie Revere Engineer Challenge

Suggested Websites

- www.discoveryeducation.com
- www.brainpopjr.com

Suggested Materials
- ITEEA's Engineering byDesign™ Program

Cross-Curricular Connections

Computer Science-

8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.

8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.

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8.1.2.NI.2: Describe how the internet enables individuals to connect with others worldwide.

8.1.2.NI.3: Create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others.

8.1.2.NI.4: Explain why access to devices need to be secured.

8.1.2.DA.1: Collect and ;present data, including climate change data, in various formats.

8.1.2.DA.4: Make predictions based on data using charts or graphs.

8.1.2.AP.1: MOdel daily processes by creating and following algorithms to complete a task.

8.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks.

8.1.2.AP.5: DEscribe a program's sequence of events, goals, and expected outcomes.

21st Century Skills –

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

Science-

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Social Studies-

6.1.2.CivicsPD.1: Engage in discussions effectively by asking questions, considering facts, listening to the ideas of others, and sharing opinions.

6.1.2.CivicsPD.2: Establish a process for how individuals can effectively work together to make decisions.

6.1.2.CivicsPR.3: Analyze classroom rules and routines and describe how they are designed to benefit the common good.

6.1.2.CivicsPR.4: Explain how individuals can work together to make decisions in the classroom.

6.1.2.CivicsCM.2: Use examples from a variety of sources to describe how certain characteristics can help individuals collaborate and solve problems (e.g., open-mindedness, compassion, civility, persistence).