

ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

DEPARTMENT

Science

COURSE TITLE

K- 5 Science

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BOARD OF EDUCATION INITIAL ADOPTION DATE:

Integration of 21st Century Themes and Skills

Educational Technology

Standards: 8.1.2.A.4, 8.1.5.C.1, 8.1.2.E.1

- **Technology Operations and Concepts:** Students can demonstrate developmentally appropriate navigation skills in virtual environments
 - **Example:** Students can explore virtual investigations found within our online FOSS profiles. While engaged in online activities, students can test hypothesis, conduct investigations, and respond to questions pertinent to the science unit of study.
- **Communication and Collaboration:** Students can engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.
 - **Example:** Students can create websites containing their scientific findings and C-E-R (claim, evidence, reason) paragraphs. Classmates and students around the world can access the safe sites and comment on the work, comparing and evaluating their findings. Additionally, classes might use Skype to discuss their findings with others as well. This may include, but is not limited to, experts or classrooms in other countries/communities.
- **Research and Information Fluency:** Students can use digital tools and online resources to explore a problem or issue.
 - **Example:** Students often research their topics using approved websites (ie: *Ducksters*, *The Kids Should See This*, *Wonderopolis*, etc.). They are taught nonfiction reading strategies and cyber safety skills. Both give students the opportunity to explore scientific problems or issues either individually or as a member of a group.

Career Ready Practices

Standards: CRP1, CRP4, CRP6

- **CRP1.** Act as a responsible and contributing citizen and employee Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
 - **Example:** Students will demonstrate the responsibilities associated with being a member of a community when engaging collaboratively during sharing in pairs/trios, and participating in whole group discussions. Examples may include jigsaw and fishbowl activities.
- **CRP4.** Communicate clearly and effectively and with reason. Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
 - **Example:** Students will craft C-E-R (claim, evidence, reason) paragraphs that detail their finding and scientific reasoning to support their thinking. Differentiated examples include using sentence starters, graphic organizers, etc.
- **CRP6.** Demonstrate creativity and innovation. Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
 - **Example:** Students will engage in STEAM activities and natural phenomena investigations. These encourage students to apply what they have learned as they work collaboratively to develop new solutions, technology, or ideas when solving a problem.

Robbinsville Ready 21st Century Skill Integration

The following skills will be embedded throughout the curriculum and instruction of this course.

Collaborative Team Member: Robbinsville students will learn more by working together than in isolation. As educational theorist Lev Vygotsky advocated, learning is a social process. Many workplaces today encourage employees to work in teams to solicit diverse perspectives, brainstorm new ideas and/or products, and solve problems. Further, collaboration fosters interpersonal relationships, self-management skills, cooperation, and a sense of collective responsibility. Collaborative team members are able to work with diverse groups of people who hold a variety of perspectives.

Effective Communicator: Robbinsville students must be able to clearly articulate their ideas orally, in writing, and across various media in order to successfully connect to the world around them. As the world becomes increasingly globalized, communication is more than just sharing one's ideas. Effective communicators are able to communicate their convictions, actively listen and analyze others' work to identify perspective and/or potential bias.

Emotionally Intelligent Learner: Robbinsville students who are emotionally intelligent learn to be empathetic, demonstrate integrity and ethical behavior, are kind, are self-aware, willing to change, and practice self-care. They are better able to cope with the demands of the 21st century digital society and workplace because they are reliable, responsible, form stable and healthy relationships, and seek to grow personally and professionally. Emotionally intelligent people are able to manage their emotions, work effectively on teams and are leaders who can grow and help to develop others.

Informed and Involved Citizen: Robbinsville students need to be digital citizens who are civically and globally aware. The concept of what it means to be "literate" has evolved along with 21st century technological and cultural shifts. Our progressive vision of literacy entails having our students explore real world problems in the classroom. Informed and involved citizens are able to safely and accurately communicate with people all around the world and are financially, environmentally and informationally literate.

Innovative Thinker: Robbinsville students must encompass innovative thinking skills in order to be successful lifelong learners in the 21st century world. As stated by Karl Fisch and Scott McLeod in the short film Shift Happens, "We are currently preparing students for jobs that don't yet exist . . . using technologies that haven't been invented . . . in order to solve problems we don't even know are problems yet." Innovative thinkers are able to think analytically, solve problems critically, creatively engage in curiosity and tinkering, and demonstrate originality.

Resilient and Self-Directed Learner: Robbinsville students need to take risks and ultimately make independent and informed decisions in an ever-changing world. Author of *Life, the Truth, and Being Free*, Steve Maraboli stated, "Life doesn't get easier or more forgiving, we get stronger and more resilient." Self-directed scholars of the 21st century are able to set goals, initiate resolutions by seeking creative approaches, and adjust their thinking in light of difficult situations. Resilient students are able to take risks without fear of failure and overcome setbacks by utilizing

experiences to confront new challenges. Resilient and self directed scholars will consistently embrace opportunities to initiate solutions and overcome obstacles.

Interdisciplinary Connections

- **English Language Arts Connection: CCSS.ELA-LITERACY.SL.K.2:** Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
 - **Example:** Students read a variety of texts pertaining to parts of a tree. They then presented their understanding of the text by matching content-specific vocabulary words to corresponding images within their science notebooks.
- **Math Connection: 2.MD.D.10:** Create a bar graph: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
 - **Example:** Students will sort objects based on shared properties. Then they will create a bar graph with up to four properties.
- **Shared Writing Connection: CCSS, ELA-LITERACY.W.2.7:** Participate in a shared writing project,
 - **Example:** Together, students and teacher will read a variety of books about plants to determine what plants need to grow. As a class students will share what they learned in the book. Then they will look at the information and collaboratively create a plant life cycle chart and shared writing piece.
- **English Language Arts Connection: CCSS.ELA-LITERACY.W.5.7:** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
 - **Example:** Students are study the movement of matter among plants, animals, decomposers and the environment. Either individually or within a small group, they will research an animal of their chosing and use several sources to compile their facts.

General Differentiated Instruction Strategies

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| <ul style="list-style-type: none"> ● Leveled texts ● Chunking texts ● Choice board ● Socratic Seminar ● Tiered Instruction ● Small group instruction ● Guided Reading ● Sentence starters/frames ● Writing scaffolds ● Tangible items/pictures ● Adjust length of assignment | <ul style="list-style-type: none"> ● Repeat, reword directions ● Brain breaks and movement breaks ● Brief and concrete directions ● Checklists for tasks ● Graphic organizers ● Assistive technology (spell check, voice to type) ● Study guides ● Tiered learning stations ● Tiered questioning ● Data-driven student partnerships ● Extra time |
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Possible Additional Strategies for Special Education Students, At-Risk Students, and English Language Learners (ELLs)

Time/General	Processing	Comprehension	Recall
<ul style="list-style-type: none"> ● Extra time for assigned tasks ● Adjust length of assignment ● Timeline with due dates for reports and projects ● Communication system between home and school ● Provide lecture notes/outline 	<ul style="list-style-type: none"> ● Extra Response time ● Have students verbalize steps ● Repeat, clarify or reword directions ● Mini-breaks between tasks ● Provide a warning for transitions ● Reading partners 	<ul style="list-style-type: none"> ● Precise step-by-step directions ● Short manageable tasks ● Brief and concrete directions ● Provide immediate feedback ● Small group instruction ● Emphasize multi-sensory learning 	<ul style="list-style-type: none"> ● Teacher-made checklist ● Use visual graphic organizers ● Reference resources to promote independence ● Visual and verbal reminders ● Graphic organizers
Assistive Technology	Assessments and Grading	Behavior/Attention	Organization
<ul style="list-style-type: none"> ● Computer/whiteboard ● Tape recorder ● Spell-checker ● Audio-taped books 	<ul style="list-style-type: none"> ● Extended time ● Study guides ● Shortened tests ● Read directions aloud 	<ul style="list-style-type: none"> ● Consistent daily structured routine ● Simple and clear classroom rules ● Frequent feedback 	<ul style="list-style-type: none"> ● Individual daily planner ● Display a written agenda ● Note-taking assistance ● Color code materials

Enrichment

The goal of Enrichment is to provide learners with the opportunity to participate in extension activities that are differentiated and enhance the curriculum. All enrichment decisions will be based upon individual student needs.

- Show a high degree of intellectual, creative and/or artistic ability and demonstrate this ability in multiple ways.
- Pose questions and exhibit sincere curiosity about principles and how things work.
- The ability to grasp concepts and make real world and cross-curricular connections.
- Generate theories and hypotheses and pursue methods of inquiry.
- Produce products that express insight, creativity, and excellence.
- Possess exceptional leadership skills.
- Evaluate vocabulary
- Elevate Text Complexity
- Inquiry based assignments and projects
- Independent student options
- Tiered/Multi-level activities
- Purposeful Learning Center
- Open-ended activities and projects
- Form and build on learning communities
- Providing pupils with experiences outside the 'regular' curriculum
- Altering the pace the student uses to cover regular curriculum in order to explore topics of interest in greater depth/breadth within their own grade level
- A higher quality of work than the norm for the given age group.
- The promotion of a higher level of thinking and making connections.
- The inclusion of additional subject areas and/or activities (cross-curricular).
- Using supplementary materials in addition to the normal range of resources.

English Language Learner (ELL) Resources

- Learning style quiz for students- <http://www.educationplanner.org/students/self-assessments/learning-styles-quiz.shtml>
- “Word clouds” from text that you provide-<http://www.wordle.net/>
- Bilingual website for students, parents and educators: <http://www.colorincolorado.org/>
- Learn a language for FREE-www.Duolingo.com
- Time on task for students-<http://www.online-stopwatch.com/>
- Differentiation activities for students based on their Lexile-www.Mobymax.com
- WIDA-<http://www.wida.us/>
- Everything ESL - <http://www.everythingESL.net>
- ELL Tool Box Suggestion Site<http://www.wallwisher.com/wall/elltoolbox>
- Hope4Education - <http://www.hope4education.com>
- Learning the Language <http://blogs.edweek.org/edweek/learning-the-language/>
- FLENJ (Foreign Language Educators of NJ) 'E-Verse' wiki: <http://www.flenj.org/Publications/?page=135>
- OELA - <http://www.ed.gov/offices/OBEMLA>
- New Jersey Department of Education- Bilingual Education information <http://www.state.nj.us/education/bilingual/>

Special Education Resources

- Animoto -Animoto provides tools for making videos by using animation to pull together a series of images and combining with audio. Animoto videos or presentations are easy to publish and share. <https://animoto.com>
- Bookbuilder -Use this site to create, share, publish, and read digital books that engage and support diverse learners according to their individual needs, interests, and skills. <http://bookbuilder.cast.org/>
- CAST -CAST is a non-profit research and development organization dedicated to Universal Design for Learning (UDL). UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. <http://www.cast.org>
- CoSketch -CoSketch is a multi-user online whiteboard designed to give you the ability to quickly visualize and share your ideas as images. <http://www.cosketch.com/>
- Crayon -The Crayon.net site offers an electronic template for students to create their own newspapers. The site allows you to bring multiple sources together, thus creating an individualized and customized newspaper. <http://crayon.net/> Education Oasis -Education Oasis offers a collection of graphic organizers to help students organize and retain knowledge – cause and effect, character and story, compare and

contrast, and more! <http://www.educationoasis.com/printables/graphic-organizers/>

- Edutopia -A comprehensive website and online community that increases knowledge, sharing, and adoption of what works in K-12 education. We emphasize core strategies: project-based learning, comprehensive assessment, integrated studies, social and emotional learning, educational leadership and teacher development, and technology integration. <http://www.edutopia.org/>
- Glogster -Glogster allows you to create "interactive posters" to communicate ideas. Students can embedded media links, sound, and video, and then share their posters with friends. <http://edu.glogster.com/?ref=personal>
- Interactives – Elements of a Story -This interactive breaks down the important elements of a story. Students go through the series of steps for constructing a story including: Setting, Characters, Sequence, Exposition, Conflict, Climax, and Resolution. <http://www.learner.org/interactives/story/index.html>
- National Writing Project (NWP) -Unique in breadth and scale, the NWP is a network of sites anchored at colleges and universities and serving teachers across disciplines and at all levels, early childhood through university. We provide professional development, develop resources, generate research, and act on knowledge to improve the teaching of writing and learning in schools and communities. <http://www.nwp.org>
- Pacecar -Vocab Ahead offers videos that give an active demonstration of vocabulary with audio repeating the pronunciation, definition, various uses, and synonyms. Students can also go through flash cards which give a written definition and visual representation of the word. <http://pacecar.missingmethod.com/>