KPBSD Robotics I & II Curriculum – 2017

Industry Standards

ITEEA STANDARDS

1. Students will develop an understanding of the characteristics and scope of technology. 1.H
2. Students will develop an understanding of the core concepts of technology. 2.N, 2.S, 2.Z, 2DD
3. Students will develop an understanding of the cultural, social, economic, and political effects of technology. 4.F
4. Students will develop an understanding of the influence of technology on history. 7.C
5. Students will develop an understanding of the attributes of design. 8F, 8G
6. Students will develop an understanding of engineering design. 9G & 9L
7. Students will develop the abilities to use and maintain technological products and systems. 12.I, 12.K, 12.L
8. Students will develop an understanding of and be able to select and use energy and power technologies. 16.H
9. Students will develop an understanding of and be able to select and use construction technologies. 20.L

NEXT GENERATION SCIENCE STANDARDS

1. Motion and Stability: Forces and Interactions. PS2-2
2. Energy. PS3-3

Transfer Goals

Students will be able to independently use their learning to…

- Solve complex multi-faceted problems using a variety of technology.
- Effectively brainstorm, design, and execute a solution with a team.
- Effectively present their ideas to a variety of audiences in a professional manner.
- Be able to transfer abstract ideas to a concrete tangible finished product through the engineering design process.

Meaning

ENDURING UNDERSTANDINGS

Students will understand…

- Technology is an integral part of current and future engineering design processes.
- Effective team interactions are as important to the final design as the physical parts and build process.
- Time management is the most important part of the engineering design process when working in real-world situations.

ESSENTIAL QUESTIONS

Students will keep considering…

- What part does the student play in the overall engineering design and build process?
- What part does technology play in the overall engineering design and build process?
- How can students utilize limited resources and time constraints to complete a challenge?

Acquisition

Students will know…

- Technology is closely linked to creativity, which has resulted in innovation.
- How to choose the appropriate tools, materials, and machines to design, operate, and maintain systems.
- Appropriate mathematic equations to solve design issues.
- That teamwork is an important part of the engineering design process that includes participation, compromise, documentation, and communication through varied media.

Students will be skilled at…

- Analyzing a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- Evaluating a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

3. Waves and Their Applications in Technologies for Information Transfer. PS4-5 4. Engineering Design. ETS1-1, -2, -3 http://curriculum.vexrobotics.com/teacher-materials/standards-matching-and-accreditation **ALASKA STANDARDS ALIGNMENT:** G-CO.D: Congruence: Make geometric constructions G-SRT.D: Similarity, Right Triangles, and Trigonometry: Apply trigonometry to general triangles G-GMD.B: Geometric Measurement and Dimension G-MG.A: Modeling with Geometry WHST.9-10.2d & 10.6: Text Types and Purposes WHST.9-10.9-10: Research to Build and Present Knowledge	• Quality control is a planned process to ensure that a product, service, or system meets established criteria. • The development and use of technology poses ethical issues. • Many inventions and innovations have evolved by using slow and methodical processes of tests and refinements. • The design process includes many stages, factors, and inherently designs have a set of constraints and criteria. • How to evaluate a solution based on the needs of customers, society, or the environment. • Power systems are used to drive and provide propulsion to other technological products and systems.	• Applying appropriate mathematic equations to solve design issues. • Integrating team discussion topics into an effective design and build.

Evidence

Evaluative Criteria	Assessment Evidence
Successful Completion will be determined through the following avenues: Rubrics Peer/Team Feedback Video Review Workplace Behavior	PERFORMANCE TASK(S): **Robotics I & II** • Robot Completes Single Task with remote control. • Robot Completes Single Task with autonomous control. • Engineering Notebook Entries. • Complete orthographic drawing. • Complete simple 3D CAD model from orthographic drawing. • Create and print simple 3D file. • Create 3D model of robot chassis design in CAD program. • Build robot chassis from CAD design. • Participate in Brainstorming and Revision work sessions with team.

	• Oral Presentation to Peers (both student and professionals) that includes both a visual and oral component explaining engineering design process. • Create presentation about their research of the history of robotics in society. **Robotics II** • Robot Completes Multi-Step Tasks with remote control. • Robot Completes Multi-Step Tasks with autonomous control. • Create and print a 3D file to accent their robot's task.
Resources	
Lego Mind Storms www.vexrobotics.com	