CATHOLIC SCHOOLS
DIOCESE OF GRAND RAPIDS

August 2018

Dear Catholic school families, educators, leaders and supporters,

The Office of Catholic Schools in the Diocese of Grand Rapids is pleased to present new curriculum standards outlining the academic expectations throughout our alliance of Catholic schools. By our definition, curriculum standards express the skills and content students are expected to demonstrate within courses and across grade levels. These standards provide normative targets for student performance. When a student has successfully completed a course or grade level, he or she will have demonstrated competence in the knowledge, skills, or attitudes required of that course or grade level. We have created these new curriculum standards in order to express the Catholic identity within our curriculum and to articulate the profile of a graduate of our diocesan schools. Developing these curriculum standards has been a two-year process involving educators, administrators and clergy. Like all curriculum revisions, this process is never entirely finished, and an annual review will allow us to update these documents to reflect what is best for our schools.

The sources used to create our diocesan curriculum standards vary by content area, but each is rooted in the Catechism of the Catholic Church and the Cardinal Newman Society's *Catholic Curriculum Standards*. Additionally, the curriculum standards from various dioceses and national organizations of educators; curriculum guidelines from Michigan and other states; material from professional organizations, such as College Board, which produces the Scholastic Assessment Test (SAT) suite and the Advanced Placement (AP) assessments; and Northwest Evaluation Association (NWEA), which produces the Measure of Academic Progress (MAP) assessments, were used as references. Each of these sources is referenced in the acknowledgements following each content area document. Importantly, we also accounted for the cultures and communities of our local schools, as no standards should be adopted without consideration of the unique and specific desires of the Catholic families in the diocese.

Hundreds of diocesan teachers and administrators worked tirelessly to produce the content and wording of these curriculum standards over eighteen months, from summer 2016 through winter 2017. The curriculum standards were then reviewed by local experts in theology, including diocesan priests and Aquinas College professors. This combination of experts ensures that the curriculum is rooted in our Catholic faith, is interculturally appropriate for our diocese, and provides educational best practices to inspire excellence in Catholic education. The final review was completed by Most Reverend David J. Walkowiak, bishop of Grand Rapids and Mr. David Faber, superintendent of Catholic schools in the Diocese of Grand Rapids.

In sharing these documents with you, we invite you to explore how our alliance of Catholic schools strives to provide our students with an outstanding education that allows them to grow in faith and grace, achieve more in school and life, develop creativity and character, and feel welcome and cherished.

In Christ,

Jill Annable
Assistant Superintendent for Curriculum, Instruction, and Technology Integration
Office of Catholic Schools, Diocese of Grand Rapids

Cathedral Square Center
360 Division Avenue South
Grand Rapids, MI 49503

T 616.246.0590
F 616.551.5650

CatholicSchools4U.org

Diocese of Grand Rapids
Office of Catholic Schools
Curriculum Standards
for Technology
in grades K-12

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Program Goal

Students attending Catholic schools in the Diocese of Grand Rapids are taught to utilize available and emerging technologies for education, communication, problem solving, analysis, and research in accordance with Catholic values, ethical principles, and moral decision making. In our technology courses, students develop life skills necessary to meet the technological and ethical challenging of living and working with technology, and we are called by the Catholic Church to embrace technologies for the New Evangelization.

Catholic Church Teachings

From the Catechism of the Catholic Church

2293 Basic scientific research, as well as applied research, is a significant expression of man's dominion over creation. Science and technology are precious resources when placed at the service of man and promote his integral development for the benefit of all. By themselves however they cannot disclose the meaning of existence and of human progress. Science and technology are ordered to man, from whom they take their origin and development; hence they find in the person and in his moral values both evidence of their purpose and awareness of their limits. (159, 1703)

2294 It is an illusion to claim moral neutrality in scientific research and its applications. On the other hand, guiding principles cannot be inferred from simple technical efficiency, or from the usefulness accruing to some at the expense of others or, even worse, from prevailing ideologies. Science and technology by their very nature require unconditional respect for fundamental moral criteria. They must be at the service of the human person, of his inalienable rights, of his true and integral good, in conformity with the plan and the will of God. (2375)

1723 The beatitude we are promised confronts us with decisive moral choices. It invites us to purify our hearts of bad instincts and to seek the love of God above all else. It teaches us that true happiness is not found in riches or well-being, in human fame or power, or in any human achievement— however beneficial it may be—such as science, technology, and art, or indeed in any creature, but in God alone, the source of every good and of all love: (2519, 227)

From the Pontifical Council for Social Communications – "The Church and the Internet"

1 The Pastoral Instruction on the Means of Social Communication *Communio et Progressio* published in 1971, underlined the point: "The Church sees these media as 'gifts from God' which, in accordance with his providential design, unite men in brotherhood and so help them to cooperate with his plan for their salvation."

2 Considering the media of social communication, we see they "contribute greatly to the enlargement and enrichment of men's minds and to the propagation and consolidation of the kingdom of God."

3 The Church has a two-fold aim in regard to the media. One aspect is to encourage their right development and right use for the sake of human development, justice, and peace—for the upbuilding of society at the local, national, and community levels in light of the common good and in a spirit of solidarity.

5 Internet is relevant to many activities and programs of the Church— evangelization, including both re-evangelization and new evangelization and the traditional missionary work ad gentes, catechesis and other kinds of education, news and information, apologetics, governance and administration, and some forms of pastoral counseling and spiritual direction. Although the virtual reality of cyberspace cannot substitute for real interpersonal community, the incarnational reality of the sacraments and the liturgy, or the immediate and direct proclamation of the gospel, it can complement them, attract people to a fuller experience of the life of faith, and enrich the religious lives of users. It also provides the Church with a means for communicating with particular groups—young people and young adults, the elderly and home-bound, persons living in remote areas, the members of other religious bodies—who otherwise may be difficult to reach.

7 Education and training are another area of opportunity and need. "Today everybody needs some form of continuing media education, whether by personal study or participation in an organized program or both. More than just teaching about techniques, media education helps people form standards of good taste and truthful moral judgment, an aspect of conscience formation. Through her schools and formation programs the Church should provide media education of this kind".

Education and training regarding the Internet ought to be part of comprehensive programs of media education available to members of the Church. As much as possible, pastoral planning for social communications should make provision for this training in the formation of seminarians, priests, religious, and lay pastoral personnel as well as teachers, parents, and students.

Young people in particular need to be taught “not only to be good Christians when they are recipients but also to be active in using all the aids to communication that lie within the media...So, young people will be true citizens of that age of social communications which has already begun”—an age in which media are seen to be “part of a still unfolding culture whose full implications are as yet imperfectly understood”. Teaching about the Internet and the new technology thus involves much more than teaching techniques; young people need to learn how to function well in the world of cyberspace, make discerning judgments according to sound moral criteria about what they find there, and use the new technology for their integral development and the benefit of others.

8 At a very deep level, “the world of the media can sometimes seem indifferent and even hostile to Christian faith and morality. This is partly because media culture is so deeply imbued with a typically postmodern sense that the only absolute truth is that there are no absolute truths or that, if there were, they would be inaccessible to human reason and therefore irrelevant”.

9 The virtual reality of cyberspace has some worrisome implications for religion as well as for other areas of life. Virtual reality is no substitute for the Real Presence of Christ in the Eucharist, the sacramental reality of the other sacraments, and shared worship in a flesh-and-blood human community. There are no sacraments on the Internet; and even the religious experiences possible there by the grace of God are insufficient apart from real-world interaction with other persons of faith. Here is another aspect of the Internet that calls for study and reflection. At the same time, pastoral planning should consider how to lead people from cyberspace to true community and how, through teaching and catechesis, the Internet might subsequently be used to sustain and enrich them in their Christian commitment.

10 It is important, too, that people at all levels of the Church use the Internet creatively to meet their responsibilities and help fulfill the Church's mission.

11 *To educators and catechists*. The Pastoral Instruction *Communio et Progressio* spoke of the “urgent duty” of Catholic schools to train communicators and recipients of social communications in relevant Christian principles. The same message has been repeated many times. In the age of the Internet, with its enormous outreach and impact, the need is more urgent than ever.

Catholic universities, colleges, schools, and educational programs at all levels should provide courses for various groups—"seminarians, priests, religious brothers and sisters, and lay leaders...teachers, parents, and students"—as well as more advanced training in communications technology, management, ethics, and policy issues for individuals preparing for professional media work or decision-making roles, including those who work in social communications for the Church.

To parents. For the sake of their children, as well as for their own sakes, parents must "learn and practice the skills of discerning viewers and listeners and readers, acting as models of prudent use of media in the home". As far as the Internet is concerned, children and young people often are more familiar with it than their parents are, but parents still are seriously obliged to guide and supervise their children in its use. If this means learning more about the Internet than they have up to now, that will be all to good.

Parental supervision should include making sure that filtering technology is used in computers available to children when that is financially and technically feasible, in order to protect them as much as possible from pornography, sexual predators, and other threats. Unsupervised exposure to the Internet should not be allowed. Parents and children should dialogue together about what is seen and experienced in cyberspace; sharing with other families who have the same values and concerns will also be helpful. The fundamental parental duty here is to help children become discriminating, responsible Internet users and not addicts of the Internet, neglecting contact with their peers and with nature itself.

To children and young people. The Internet is a door opening on a glamorous and exciting world with a powerful formative influence; but not everything on the other side of the door is safe and wholesome and true. "Children and young people should be open to formation regarding media, resisting the easy path of uncritical passivity, peer pressure, and commercial exploitation". The young owe it to themselves—and to their parents and families and friends, their pastors and teachers, and ultimately to God—to use the Internet well.

The Internet places in the grasp of young people at an unusually early age an immense capacity for doing good and doing harm, to themselves and others. It can enrich their lives beyond the dreams of earlier generations and empower them to enrich others' lives in turn. It also can plunge them into consumerism, pornographic and violent fantasy, and pathological isolation.

Young people, as has often been said, are the future of society and the Church. Good use of the Internet can help prepare them for their responsibilities in both. But this will not happen automatically. The Internet is not merely a medium of entertainment and consumer gratification. It is a tool for accomplishing useful work, and the young must learn to see it and use it as such. In

cyberspace, at least as much as anywhere else, they may be called on to go against the tide, practice counter-culturalism, even suffer persecution for the sake of what is true and good.

12 *To all persons of good will.* Finally, then, we would suggest some virtues that need to be cultivated by everyone who wants to make good use of the Internet; their exercise should be based upon and guided by a realistic appraisal of its contents.

Prudence is necessary in order clearly to see the implications—the potential for good and evil—in this new medium and to respond creatively to its challenges and opportunities.

Justice is needed, especially justice in working to close the digital divide—the gap between the information-rich and the information-poor in today's world. This requires a commitment to the international common good, no less than the “globalization of solidarity”.

Fortitude, courage, is necessary. This means standing up for truth in the face of religious and moral relativism, for altruism and generosity in the face of individualistic consumerism, for decency in the face of sensuality and sin.

And temperance is needed—a self-disciplined approach to this remarkable technological instrument, the Internet, so as to use it wisely and only for good.

Organization of the K-12 Technology Curriculum Standards Across All Content Areas

The Technology Curriculum Standards for use in the Catholic Schools in the Diocese of Grand Rapids were designed in two parts: *Technology Competencies* for use in all academic courses and *Computer Science Curriculum Standards* for use in technology courses.

Integrated Technology Competencies

The *Integrated Technology Competencies* are overarching expectations of the use of technology as students prepare to be Empowered Learner, Digital Citizens, Innovative Designers, Computational Thinkers, and Global Communicators. Though the competencies are housed within the framework for technology standards, these competencies are not only developed within technology courses but also developed throughout a student's academic schedule, stretching from all core content areas to elective experiences. They are not grade level specific, but instead describe the profile of a graduate in our schools. It is the intention that a graduate of Catholic schools in the Diocese of Grand Rapids has had experience with and shown proficiency in all five competencies.

Within this document, the Technology Competencies are highlighted and identified by the following:

K-12.Tech.EL.A

To identify the first Empowered Learner competency used in a kindergarten through twelfth grade course.

Competencies Defined:

Empowered Learner: Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.

Digital Citizen: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.

Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.

Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Global Communicator: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Computer Science Curriculum Standards

The *Computer Science Curriculum Standards* are specific objectives for technology courses. These are articulated within four grade bands: K-2, 3-5, 6-8, and 9-12 and are categorized by the five Technology Competencies. As students progress through the grade bands, the coursework becomes more specialized and specific in computer science. At the high school level, the technology courses are electives among choices, and not all graduates will have shown proficiency on all computer science standards in the 9-12 grade band.

Within this document, the *Computer Science Curriculum Standards* are highlighted and identified by the following:

3-5.Tech.DC.4

To identify the fourth Digital Citizen curriculum standard within a third through fifth grade technology course.

Abbreviations Used in this Document:

Tech Technology
EL Empowered Learner
DC Digital Citizen
ID Innovative Designer
CT Computational Thinker
GC Global Communicator

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Kindergarten through Second Grade Technology Curriculum Standards

Students who demonstrate understanding of second grade Technology are able to --

Empowered Learner **Empowered Learner:** Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. *"Prudence is necessary in order clearly to see the implications—the potential for good and evil—in this new medium and to respond creatively to its challenges and opportunities" (The Church and the Internet, 12)*		
K-12.Tech.EL.A	Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.	
K-12.Tech.EL.B	Build networks and customize their learning environments in ways that support the learning process.	
K-12.Tech.EL.C	Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	
K-12.Tech.EL.D	Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.	
	Full Standard	**Report Card Wording**
K-2.Tech.EL.1	Select and operate appropriate software to perform a variety of tasks.	Select and operate appropriate software.
Digital Citizen		

Digital Citizen: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.

"Justice is needed, especially justice in working to close the digital divide—the gap between the information-rich and the information-poor in today's world. This requires a commitment to the international common good, no less than the 'globalization of solidarity.

Fortitude, courage, is necessary. This means standing up for truth in the face of religious and moral relativism, for altruism and generosity in the face of individualistic consumerism, for decency in the face of sensuality and sin" (The Church and the Internet, 12).

K-12.Tech.DC.A	Cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.	
K-12.Tech.DC.B	Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.	
K-12.Tech.DC.C	Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.	
K-12.Tech.DC.D	Manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.	
K-12.Tech.DC.E	Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.	
K-12.Tech.DC.F	Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.	
K-12.Tech.DC.G	Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.	
K-12.Tech.DC.H	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	
	Full Standard	**Report Card Wording**

K-2.Tech.DC.1	Recognize safe and responsible ways to use technology within a monitored environment.	Recognize safe and responsible ways to use technology.
Innovative Designer **Innovative Designer:** Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. *"It is important, too, that people at all levels of the Church use the Internet creatively to meet their responsibilities and help fulfill the Church's mission" (The Church and the Internet, 10).*		
K-12.Tech.ID.A	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	
K-12.Tech.ID.B	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	
K-12.Tech.ID.C	Develop, test and refine prototypes as part of a cyclical design process.	
K-12.Tech.ID.D	Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	
	Full Standard	**Report Card Wording**
K-2.Tech.ID.1	Store, copy, search, retrieve, modify, and delete information using a computing device and define the information stored as data.	Store, copy, search, retrieve, modify, and delete information.
Computational Thinker **Computational Thinker:** Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. *"And temperance is needed—a self-disciplined approach to this remarkable technological instrument, the Internet, so as to use it wisely and only for good" (The Church and the Internet, 12).*		
K-12.Tech.CT.A	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.	

K-12.Tech.CT.B	Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.	
K-12.Tech.CT.C	Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	
K-12.Tech.CT.D	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	
	Full Standard	**Report Card Wording**
K-2.Tech.CT.1	Use basic coding skills to identify and create patterns, identify and correct errors in a sequence, and solve problems.	Use basic coding skills.
Global Communicator **Global Communicator:** Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. *The Church has a two-fold aim in regard to the media. One aspect is to encourage their right development and right use for the sake of human development, justice, and peace—for the upbuilding of society at the local, national, and community levels in light of the common good and in a spirit of solidarity" (Church and the Internet, 3).*		
K-12.Tech.GC.A	Use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.	
K-12.Tech.GC.B	Use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.	
K-12.Tech.GC.C	Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.	
K-12.Tech.GC.D	Explore local and global issues and use collaborative technologies to work with others to investigate solutions.	
K-12.Tech.GC.E	Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.	

K-12.Tech.GC.F	Create original works or responsibly repurpose or remix digital resources into new creations.
K-12.Tech.GC.G	Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
K-12.Tech.GC.H	Publish or present content that customizes the message and medium for their intended audiences.

Third through Fifth Grade Technology Curriculum Standards

Students who demonstrate understanding of fifth grade technology are able to --

Empowered Learner **Empowered Learner:** Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. *"Prudence is necessary in order clearly to see the implications—the potential for good and evil—in this new medium and to respond creatively to its challenges and opportunities" (The Church and Internet, 12)*		
K-12.Tech.EL.A	Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.	
K-12.Tech.EL.B	Build networks and customize their learning environments in ways that support the learning process.	
K-12.Tech.EL.C	Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	
K-12.Tech.EL.D	Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.	
	Full Standard	**Report Card Wording**
3-5.Tech.EL.1	Create a model to describe how internal and external parts of computing devices function to form a system.	Create model to describe how parts function to form a system.
3-5.Tech.EL.2	Apply common troubleshooting strategies to identify and solve routine hardware and software problems.	Apply common troubleshooting strategies.
Digital Citizen **Digital Citizen:** Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.		

"Justice is needed, especially justice in working to close the digital divide—the gap between the information-rich and the information-poor in today's world. This requires a commitment to the international common good, no less than the 'globalization of solidarity. *Fortitude, courage, is necessary. This means standing up for truth in the face of religious and moral relativism, for altruism and generosity in the face of individualistic consumerism, for decency in the face of sensuality and sin" (The Church and Internet, 12).*	
K-12.Tech.DC.A	Cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
K-12.Tech.DC.B	Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.
K-12.Tech.DC.C	Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.
K-12.Tech.DC.D	Manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.
K-12.Tech.DC.E	Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
K-12.Tech.DC.F	Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
K-12.Tech.DC.G	Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
K-12.Tech.DC.H	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

	Full Standard	Report Card Wording
3-5.Tech.DC.1	Discuss real-world cybersecurity problems and how personal information can be protected.	Discuss real-world cybersecurity problems.
3-5.Tech.DC.2	Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.	Brainstorm ways to improve usability.

Innovative Designer **Innovative Designer:** Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. *"It is important, too, that people at all levels of the Church use the Internet creatively to meet their responsibilities and help fulfill the Church's mission" (The Church and Internet, 10).*		
K-12.Tech.ID.A	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	
K-12.Tech.ID.B	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	
K-12.Tech.ID.C	Develop, test and refine prototypes as part of a cyclical design process.	
K-12.Tech.ID.D	Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	
	Full Standard	**Report Card Wording**
3-5.Tech.ID.1	Store, copy, search, retrieve, modify, and delete information using a computing device, in order to represent purposeful data.	Represent purposeful data.
Computational Thinker **Computational Thinker:** Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. *"And temperance is needed—a self-disciplined approach to this remarkable technological instrument, the Internet, so as to use it wisely and only for good" (The Church and Internet, 12).*		
K-12.Tech.CT.A	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.	
K-12.Tech.CT.B	Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.	

K-12.Tech.CT.C	Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	
K-12.Tech.CT.D	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	
	Full Standard	**Report Card Wording**
3-5.Tech.CT.1	Compare and refine multiple algorithms for the same task and determine which is the most appropriate.	Compare and refine multiple algorithms.
3-5.Tech.CT.2	Create programs that include sequences, events, loops, and conditionals.	Create programs.
3-5.Tech.CT.3	Test and debug a program or algorithm to ensure it runs as intended.	Test and debug a program/ algorithm.
Global Communicator **Global Communicator:** Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. *The Church has a two-fold aim in regard to the media. One aspect is to encourage their right development and right use for the sake of human development, justice, and peace—for the upbuilding of society at the local, national, and community levels in light of the common good and in a spirit of solidarity" (Church and the Internet, 3).*		
K-12.Tech.GC.A	Use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.	
K-12.Tech.GC.B	Use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.	
K-12.Tech.GC.C	Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.	
K-12.Tech.GC.D	Explore local and global issues and use collaborative technologies to work with others to investigate solutions.	

K-12.Tech.GC.E	Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
K-12.Tech.GC.F	Create original works or responsibly repurpose or remix digital resources into new creations.
K-12.Tech.GC.G	Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
K-12.Tech.GC.H	Publish or present content that customizes the message and medium for their intended audiences.

Sixth through Eighth Grade Technology Curriculum Standards

Students who demonstrate understanding of eighth grade technology are able to --

Empowered Learner **Empowered Learner:** Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. *"Prudence is necessary in order clearly to see the implications—the potential for good and evil—in this new medium and to respond creatively to its challenges and opportunities" (The Church and Internet, 12)*		
K-12.Tech.EL.A	Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.	
K-12.Tech.EL.B	Build networks and customize their learning environments in ways that support the learning process.	
K-12.Tech.EL.C	Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	
K-12.Tech.EL.D	Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.	
	Full Standard	**Report Card Wording**
6-8.Tech.EL.1	Design projects that combine hardware and software components to collect and exchange data.	Design projects to collect and exchange data.
6-8.Tech.EL.2	Systematically identify and fix problems with computing devices and their components.	Systematically identify and fix problems.
Digital Citizen **Digital Citizen:** Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.		

"Justice is needed, especially justice in working to close the digital divide—the gap between the information-rich and the information-poor in today's world. This requires a commitment to the international common good, no less than the 'globalization of solidarity. *Fortitude, courage, is necessary. This means standing up for truth in the face of religious and moral relativism, for altruism and generosity in the face of individualistic consumerism, for decency in the face of sensuality and sin" (The Church and Internet, 12).*		
K-12.Tech.DC.A	Cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.	
K-12.Tech.DC.B	Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.	
K-12.Tech.DC.C	Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.	
K-12.Tech.DC.D	Manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.	
K-12.Tech.DC.E	Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.	
K-12.Tech.DC.F	Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.	
K-12.Tech.DC.G	Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.	
K-12.Tech.DC.H	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	
	Full Standard	**Report Card Wording**
6-8.Tech.DC.1	Apply multiple methods of encryption to model the secure transmission of information.	Model the secure transmission of information.
6-8.Tech.DC.2	Manage personal data and accounts to maintain digital privacy and security while practicing virtuous behavior.	Manage personal data to maintain digital privacy/security.

6-8.Tech.DC.3	Build awareness of data-collection technology used to track people's navigation online.	Build awareness of data-collection technology.
6-8.Tech.DC.4	Use public domain or creative commons media, and refrain from copying or using material created by others without permission.	Use public domain or creative commons media.
Innovative Designer **Innovative Designer:** Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. *"It is important, too, that people at all levels of the Church use the Internet creatively to meet their responsibilities and help fulfill the Church's mission" (The Church and Internet, 10).*		
K-12.Tech.ID.A	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	
K-12.Tech.ID.B	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	
K-12.Tech.ID.C	Develop, test and refine prototypes as part of a cyclical design process.	
K-12.Tech.ID.D	Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	
	Full Standard	**Report Card Wording**
6-8.Tech.ID.1	Represent data using multiple encoding schemes.	Represent data using multiple encoding schemes.
6-8.Tech.ID.2	Collect data using computational tools and transform the data to make it more useful and reliable.	Collect data using computational tools.
6-8.Tech.ID.3	Refine computational models based on the data they have generated.	Refine computational models.
Computational Thinker **Computational Thinker:** Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.		

"And temperance is needed—a self-disciplined approach to this remarkable technological instrument, the Internet, so as to use it wisely and only for good" (The Church and Internet, 12).		
K-12.Tech.CT.A	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.	
K-12.Tech.CT.B	Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.	
K-12.Tech.CT.C	Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	
K-12.Tech.CT.D	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	
	Full Standard	**Report Card Wording**
6-8.Tech.CT.1	Use flowcharts and/or pseudocode to address complex problems as algorithms.	Use flowcharts and/or pseudocode.
6-8.Tech.CT.2	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.	Design and develop programs.
6-8.Tech.CT.3	Develop a sequence of steps to create and test automated solutions, in order to explore the use of automation and use algorithmic thinking.	Develop a sequence of steps to create and test automated solutions.
6-8.Tech.CT.4	Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.	Decompose problems and subproblems into parts.

Global Communicator

Global Communicator: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

The Church has a two-fold aim in regard to the media. One aspect is to encourage their right development and right use for the sake of human development, justice, and peace—for the upbuilding of society at the local, national, and community levels in light of the common good and in a spirit of solidarity" (Church and the Internet, 3).	
K-12.Tech.GC.A	Use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
K-12.Tech.GC.B	Use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
K-12.Tech.GC.C	Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.
K-12.Tech.GC.D	Explore local and global issues and use collaborative technologies to work with others to investigate solutions.
K-12.Tech.GC.E	Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
K-12.Tech.GC.F	Create original works or responsibly repurpose or remix digital resources into new creations.
K-12.Tech.GC.G	Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
K-12.Tech.GC.H	Publish or present content that customizes the message and medium for their intended audiences.

Ninth through Twelfth Grade Technology Curriculum Standards

Reminder: Standards denoted with a letter at the end of the sequence indicate competencies that are supported across grade bands and content areas. Standards denoted with a number at the end of the sequence indicate standards that may be course-specific. For more details, please refer to the introductory standards information.

Students who demonstrate understanding of eighth grade technology are able to --

Empowered Learner **Empowered Learner:** Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. *"Prudence is necessary in order clearly to see the implications—the potential for good and evil—in this new medium and to respond creatively to its challenges and opportunities" (The Church and Internet, 12)*	
K-12.Tech.EL.A	Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
K-12.Tech.EL.B	Build networks and customize their learning environments in ways that support the learning process.
K-12.Tech.EL.C	Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
K-12.Tech.EL.D	Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
HS.Tech.EL.1	Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.
HS.Tech.EL.2	Compare levels of abstraction and interactions between application software, system software, and hardware layers.
HS.Tech.EL.3	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
HS.Tech.EL.4	Categorize the roles of operating system software.

HS.Tech.EL.5	Illustrate ways computing systems implement logic, input, and output through hardware components.
HS.Tech.EL.6	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
HS.Tech.EL.7	Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).
Digital Citizen **Digital Citizen:** Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical. *"Justice is needed, especially justice in working to close the digital divide—the gap between the information-rich and the information-poor in today's world. This requires a commitment to the international common good, no less than the 'globalization of solidarity.* *Fortitude, courage, is necessary. This means standing up for truth in the face of religious and moral relativism, for altruism and generosity in the face of individualistic consumerism, for decency in the face of sensuality and sin" (The Church and Internet, 12).*	
K-12.Tech.DC.A	Cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
K-12.Tech.DC.B	Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.
K-12.Tech.DC.C	Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.
K-12.Tech.DC.D	Manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.
K-12.Tech.DC.E	Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
K-12.Tech.DC.F	Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.

K-12.Tech.DC.G	Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
K-12.Tech.DC.H	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
HS.Tech.DC.1	Give examples to illustrate how sensitive data can be affected by malware and other attacks.
HS.Tech.DC.2	Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.
HS.Tech.DC.3	Compare various security measures, considering tradeoffs between the usability and security of a computing system.
HS.Tech.DC.4	Explain trade offs when selecting and implementing cybersecurity recommendations.
HS.Tech.DC.5	Compare ways software developers protect devices and information from unauthorized access.
HS.Tech.DC.6	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
HS.Tech.DC.7	Test and refine computational artifacts to reduce bias and equity deficits.
HS.Tech.DC.8	Demonstrate ways a given algorithm applies to problems across disciplines.
HS.Tech.DC.9	Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.
HS.Tech.DC.10	Explain the beneficial and harmful effects that intellectual property laws can have on innovation.
HS.Tech.DC.11	Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.
HS.Tech.DC.12	Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.
HS.Tech.DC.13	Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society.
HS.Tech.DC.14	Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society.
HS.Tech.DC.15	Predict how computational innovations that have revolutionized aspects of our culture might evolve.

HS.Tech.DC.16	Debate laws and regulations that impact the development and use of software.
Innovative Designer **Innovative Designer:** Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. *"It is important, too, that people at all levels of the Church use the Internet creatively to meet their responsibilities and help fulfill the Church's mission" (The Church and Internet, 10).*	
K-12.Tech.ID.A	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
K-12.Tech.ID.B	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
K-12.Tech.ID.C	Develop, test and refine prototypes as part of a cyclical design process.
K-12.Tech.ID.D	Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
HS.Tech.ID.1	Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.
HS.Tech.ID.2	Evaluate the tradeoffs in how data elements are organized and where data is stored.
HS.Tech.ID.3	Create interactive data visualizations using software tools to help others better understand real-world phenomena.
HS.Tech.ID.4	Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.
HS.Tech.ID.5	Use data analysis tools and techniques to identify patterns in data representing complex systems.
HS.Tech.ID.6	Select data collection tools and techniques to generate data sets that support a claim or communicate information.
HS.Tech.ID.7	Evaluate the ability of models and simulations to test and support the refinement of hypotheses.
Computational Thinker	

Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. *"And temperance is needed—a self-disciplined approach to this remarkable technological instrument, the Internet, so as to use it wisely and only for good" (The Church and Internet, 12).*	
K-12.Tech.CT.A	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
K-12.Tech.CT.B	Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
K-12.Tech.CT.C	Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
K-12.Tech.CT.D	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
HS.Tech.CT.1	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.
HS.Tech.CT.2	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.
HS.Tech.CT.3	Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made.
HS.Tech.CT.4	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.
HS.Tech.CT.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
HS.Tech.CT.6	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
HS.Tech.CT.7	Systematically design and develop programs for broad audiences by incorporating feedback from users.
HS.Tech.CT.8	Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries.

HS.Tech.CT.9	Evaluate and refine computational artifacts to make them more usable and accessible.
HS.Tech.CT10	Design and develop computational artifacts working in team roles using collaborative tools.
HS.Tech.CT.11	Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.
HS.Tech.CT.12	Describe how artificial intelligence drives many software and physical systems.
HS.Tech.CT.13	Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem.
HS.Tech.CT.14	Use and adapt classic algorithms to solve computational problems.
HS.Tech.CT.15	Evaluate algorithms in terms of their efficiency, correctness, and clarity.
HS.Tech.CT.16	Compare and contrast fundamental data structures and their uses.
HS.Tech.CT.17	Illustrate the flow of execution of a recursive algorithm.
HS.Tech.CT.18	Construct solutions to problems using student-created components, such as procedures, modules and/or objects.
HS.Tech.CT.19	Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.
HS.Tech.CT.20	Demonstrate code reuse by creating programming solutions using libraries and APIs.
HS.Tech.CT.21	Plan and develop programs for broad audiences using a software life cycle process.
HS.Tech.CT.22	Explain security issues that might lead to compromised computer programs.
HS.Tech.CT.23	Develop programs for multiple computing platforms.
HS.Tech.CT.24	Use version control systems, integrated development environments (IDEs), and collaborative tools and practices (code documentation) in a group software project.
HS.Tech.CT.25	Develop and use a series of test cases to verify that a program performs according to its design specifications.
HS.Tech.CT.26	Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality).
HS.Tech.CT.27	Evaluate key qualities of a program through a process such as a code review.

HS.Tech.CT.28	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.
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K-12.Tech.GC.A	Use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
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K-12.Tech.GC.C	Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.
K-12.Tech.GC.D	Explore local and global issues and use collaborative technologies to work with others to investigate solutions.
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Diocese of Grand Rapids
Office of Catholic Schools
Curriculum Standards
for Technology
in grades K-12

Acknowledgements

The Diocese of Grand Rapids Office of Catholic Schools Curriculum Standards for Technology were drafted in reflection of

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Michigan Department of Education. *Michigan Integrated Technology Competencies for Students.* 2018.

ISTE Standards for Students, International Society for Technology in Education, 2016.

Michigan Department of Education. *Michigan K-12 Standards Computer Science.* 2019.

Note on **Shared-Time Teachers**

Shared-time teachers employed by local public school districts must comply with the curriculum guidelines of the local public school districts. Each is a Michigan public school as those terms are defined within the 1998 Public Act 339. The curriculum provided in those programs shall comply with all regulations required by Public Act 339.