Saskatchewan Catholic Schools Curriculum Permeation

REVEALING CHRIST IN ALL WE TEACH

SCIENCE 5

2012

"Revealing Christ In All We Teach"

A Curriculum Permeation initiative of the Saskatchewan Catholic School Boards Association

Introduction:

"The Gospel spirit should be evident in a Christian way of thought and life which permeates all facets of the educational climate. Prime responsibility for creating this unique Christian school climate rests with the teachers, as individuals and as a community." *(The Religious Dimension of Education in a Catholic School, 1988 #25 -26.)*

Teachers in Saskatchewan are mandated by the Ministry of Education to implement provincial curricula. Teachers in Saskatchewan Catholic Schools are further charged to utilize the "Revealing Christ in All We Teach" resources to permeate the Ministry curriculum with the Catholic world view.

Our Catholic schools seek to create a learning environment that reflects the identity and character of the Catholic Church. In each of our Catholic schools throughout Saskatchewan, we strive to become learning environments in which the uniqueness of our Catholic faith is expressed in all we do.

We believe that teaching in our Catholic schools is a ministry in which all are called to witness their faith. The teaching that occurs within our Catholic schools ought to reflect more than the content and objectives of the provincial curricula. In addition to these core fundamentals, we are called to infuse our Catholic beliefs and values in all subject areas.

In an ever-increasing secular world in which religious beliefs are dismissed, we must take up the challenge to see that the teaching of our Catholic values and beliefs are not limited to Religion and Christian Ethics classes alone, but are taught across the entire curricula. Our Catholic faith must permeate all subject areas! This undertaking is critical to the distinctiveness of Catholic education in Saskatchewan.

As Catholic educators, how do we permeate our Catholic teachings across the curricula? How do we, for example, discuss our church's teachings on respect for the environment in science classes? How do we promote social justice in our studies of the humanities? How do we critique literary works through the eyes of our faith? In biology, how do we promote the sanctity of all human life, indeed, all of creation?

At the direction of the Saskatchewan Catholic School Boards Association, the following resource has been produced to assist teachers in the permeation of our Catholic faith across the curricula. A number of dedicated Catholic teachers in Saskatchewan have contributed to this resource by developing and sharing a variety of activities, lessons, and units for this purpose.

Please note: Teachers are invited to submit feedback and/or suggestions for additional faith permeation ideas to their Religious Education coordinator/consultant.

Saskatchewan Catholic Schools Curriculum Permeation

Science 5
Faith Permeation Essential Connections

Unit Theme: Life Science –Human Body Systems

This life science unit focusses on the human body, its systems and organs. Students will learn about different ways these systems work together to keep us alive. Students are expected to explore aspects of healthy living from different cultural and social perspectives. Moreover the curriculum has a strong focus on the exploration of social impacts and issues on health. This faith permeation unit concerns itself with these particular outcomes. As culture includes systems of belief and ways that people live, then our faith defines our way of life. Thus in that regard we can look to faith, scripture and tradition to explore ways that God would want us to maintain a healthy body.

Provincial Curriculum Outcomes and Indicators Addressed:

HB5.1 Analyze personal and societal requirements for, and the impact of, maintaining a healthy human body.

a. Examine methods and perspectives of various cultures, including First Nations and Métis, which have contributed to knowledge about maintaining a healthy body (e.g., balance inherent in the Medicine Wheel).

b. Identify local knowledge, including the effects of traditional lifestyles, that contributes to human understanding of maintaining a healthy body.

i. Assess the benefits of lifestyle choices (e.g., daily physical activity, proper nutrition, adequate sleep, appropriate hygiene practices, regular medical check-ups, and using safety equipment) that contribute to maintaining a healthy body.

j. Propose actions that individuals can take to minimize the harmful effects and maximize the beneficial effects of natural- and human caused environmental factors (e.g., West Nile Virus, mosquitoes, pesticides, air quality, noise pollution, food safety, and water and wastewater treatment) on human health.

HB5.2 Investigate the structure, function, and major organs of one or more human body systems such as the digestive, excretory, respiratory, circulatory, nervous, muscular, and skeletal systems.

a. Explain at least two functions of the human digestive, excretory, respiratory, circulatory, nervous, muscular, or skeletal systems.

b. Create a written and/or visual representation of the location of the major organs of at least two human body systems within the entire body.

c. Model the structure and/or function of one or more organs from the human digestive, excretory, respiratory, circulatory, nervous, muscular, or skeletal system.

k. Imagine how a human body might function or look if it did not have one or more of the major body systems.

HB5.3 Assess how multiple human body systems function together to enable people to move, grow, and react to stimuli.

a. Pose questions to investigate or suggest practical problems to solve in relation to human body systems (e.g., How are the various systems connected to each other? Could one system live without the other systems? If not, why not? Why do we need to eat? Could we breathe without a diaphragm? Which organs work hard during exercise? Why do people sometimes become paralyzed due to an injury?).

Catholic Faith Focus for Learning:

The Catholic Faith Focus for learning for this unit centers on the catechetical and scriptural teachings about respect for the human body. St. Paul summarizes our belief about the body in this passage 'Or do you not know that your body is a temple of the Holy Spirit within you, whom you have from God? You are not your own, for you were bought with a price. So glorify God in your body.' (1st Corinthians 6: 19-20). The body as the temple of the Holy Spirit becomes our Catholic faith focus for this unit.

Catholic Faith Big Ideas (answers to the essential questions):

It is our Catholic belief that the spirit of God dwells in us. When we consume the bread and drink the wine, which is consecrated and through transubstantiation becomes the body and blood of Christ, He lives in us.

Many scriptural passages reflect our belief that our bodies form God's dwelling place:

4 There is one body and one Spirit, just as you were called to the one hope of your calling, 5 one Lord, one faith, one baptism, 6 one God and Father of all, who is above all and through all and in all. (Ephesians 4:4-6)

Or do you not know that your body is a temple of the Holy Spirit within you, whom you have from God? You are not your own, for you were bought with a price. So glorify God in your body. (1st Corinthians 6: 19-20)

As you therefore have received Christ Jesus the Lord, continue to live your lives in him, 7 rooted and built up in him and established in the faith, just as you were taught, abounding in

thanksgiving. [8] See to it that no one takes you captive through philosophy and empty deceit, according to human tradition, according to the elemental spirits of the universe, and not according to Christ. [9] For in him the whole fullness of deity dwells bodily, [10] and you have come to fullness in him, who is the head of every ruler and authority.

2288 Life and physical health are precious gifts entrusted to us by God. We must take reasonable care of them, taking into account the needs of others and the common good. Concern for the health of its citizens requires that society help in the attainment of living-conditions that allow them to grow and reach maturity: food and clothing, housing, health care, basic education, employment, and social assistance. (CCC 2288)

Catholic Faith Essential Skills:

- Students will be able to describe why the body is sacred and give reasons.
- Students will understand the Church's teachings on the human body and its sanctity.

Catholic Faith Essential Questions:

1) What does it mean to be the temple of the Holy Spirit?
2) What does the church teach us about the respect we must give to our bodies and to our health?

Teacher Note:

These faith permeation lessons aim to follow and to complement three key sources: Fully Alive (FA), Pearson Saskatchewan Science 5(SPP5) and May We Be One 5 (MWBO5). When these resources are referenced in following lessons and mini-lessons they will be abbreviated.

Faith Permeation Lessons:

Lesson 1: The Church is like a Body

Description: In this lesson the students will explore ways that the church is like the human body. The body will be used as an analogy for the church. This lesson is actually comprised of small short mini lessons that will occur throughout the program as relevant sections arise.

Required time: short 15 minute blocks in relevant sections.

Instructional Procedure:

To be completed in conjunction with the section, "A Healthy Life/Get Started" on page 4. PSS5. Theme 5 of FA, topic 2, 'Communities are Like Families' Pg. 102-103 and pg. 109-115 in the student text book will help stimulate and provide background knowledge for this discussion. Readings in MWBO5 that can support the theme of community can be found in the student text on pg. 38 (biblical references to the church community), pg. 24-26 which also describe an aboriginal community in the North West Territory.

- As an entire class have students define the idea of "community". Invite students to provide examples - i.e. school, parish, Saskatoon etc.

- Discuss with students the comparison that is made between the human body and the church found in scripture. Writers of the scriptures in the early Church used different ideas and images to help people understand our relationships with God and each other. St. Paul for example used the idea of the body and compared it to the church. He states, "*For just as the body is one and has many members, and all the members of the body, though many, are one body, so it is with Christ." (NRSV 1 Corinthian 12:12)*. Just like the parts that make up a single human body, people are one in the church in Jesus. *For as in one body we have many members, and not all the members have the same function (NRSV Romans 12:44) a*nd like the different members of the body each of us has our own purpose, job and talent which contribute to the body, the church or society.

- Ask the question: How are the various systems of our bodies, connected to each other, like the ways we are connected together as a church?

- Engage students in a discussion about ways that communities, like parishes, are similar to human body systems. Try to elicit responses through questioning that direct students to think of the church and community as different parts of the body working together for a common purpose.

- Have students brainstorm ways the church is like a body. Then introduce the activity in questions 2 on pg. 5 in PSS5.

- Then as question #3 on pg. 5 of PSS5 suggests, have the students in pairs, draw and outline the body of their partners. Put this large body sized poster aside until mini lesson 2.

Lesson 1- part A:

- Engage students in this lesson after section 4 "Your Respiratory System, Part 1" on pg. 17of PSS5.

- Provide each student with a copy of the activity, "The Church is like a Body". In pairs students will only complete the boxes for the lungs after they have completed "Your Respiratory System, Part 1 and 2 from pg. 17-21 in their text.

- Then when the students are finished their answers, invite them to draw the lungs and respiratory system on their large body size poster. Transfer and record their answers from the tables below onto their large body size poster beside the appropriate organs and systems.

Example of possible answers:

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What do the lungs and the respiratory do in our bodies? *The lungs supply our cells with oxygen and rid our bodies of carbon dioxide.* *The oxygen is necessary for cells to metabolize sugar to make energy called Cellular Respiration*	Who breathes new life into our Church? Who breathes life into us? *Holy Spirit breathes new life into the Church. At Pentecost, Christ sends the Holy Spirit as tongues of flame upon his disciples.* *Reference to genesis in which God gives the breath of life to Adam.* *We breathe new life into our Churches when we share our gifts, time and talents.* *Baptism breathes new life into our church because it renews our church and adds to our communion. It is the rite of initiation which brings new members into our church.*

Lesson 1: Part B

- Have students complete the boxes for the heart and circulatory system after they have completed "Your Circulatory System" on pg. 22 in PSS5.
- Then when the students are finished their answers, invite them to draw the heart and rudimentary blood vessels on their large body size poster. Have the students transfer and record their answers from the tables below onto their large body size poster beside the appropriate organs and systems.

  Example of possible answers:

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What does your heart and circulatory system do? How do they work together? *The heart works tirelessly to pump and circulate the blood to the body. Oxygenated blood is pumped to the body and deoxygenated blood is pumped to the lungs.* *The circulatory system is a network or blood vessels*	Who do you know in your church who is like the human heart? Who can circulate goodness and love within our church? *Our Church leaders, ministers, servants, communities and people, many of whom work tirelessly in works of charity, evangelism, advocating for many worthwhile causes to 'circulate' goodness and love throughout the*

and associated organs that transport nutrients and oxygenated blood to the smallest cell. Then they return gaseous wastes to lungs to be expelled and deliver nitrogenous wastes to the excretory system to be expelled.	*world.* *Our church is the body of Christ and our diocese may be compared to a network of people who work together which acts not unlike the circulatory system which functions to keep an entire system alive.* *Our schools, homes and communities are networks like blood vessels that keep faith alive for our students.* *Blood of Christ at communion circulates in all of us. His Grace, when we receive Him, is in all of us.*

Lesson 1: Part C

Important teacher note: It is crucial that teachers help students realize the comparison between the digestive and excretory systems with aspects of our faith but that it should be done in a respectful way. A comparison between the sacraments of communion and reconciliation, for example, could be compared to the digestive system which feeds us and the excretory system which rids our bodies of harmful waste. Specifically in the sacrament of reconciliation we are purged of sin. When students make the comparison the specific systems and transfer their ideas to their large body posters, please ask students to put their ideas beside the appropriate system labels rather than next to the drawing of particular organs.

- Have students complete the boxes for the digestive and excretory systems after they have completed "Fuel In, Waste Out" from pg. 26-28 in PSS5.
- Then when the students are finished their answers, invite them to draw the digestive and excretory system on their large body size poster. Have the students transfer and record their answers from the tables next to the labels of the systems on their large body size poster beside the appropriate organs and systems.

  Example of possible answers:

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What do the digestive and excretory systems do? How do they work in tandem? *The digestive system absorbs and reduces food to energy for the cells of the body. The excretory system rids the body of waste. These systems complement each other because together they*	What part of our Church feeds us? What helps us get rid of the harmful parts of our life? *The sacraments function much like the organ systems. Bread and Wine at communion for example feeds us. Through these sacraments we*

regulate the food the body absorbs and what it expels.	*receive God's grace.* *Reconciliation cleans us of our sins but more than that, it also gives us grace.* *Reconciling ourselves to others and to God through acts of restitution restores our bodies just as food does for our digestive systems.* *Community feeds us. Homilies, church teachings and scripture reading feeds us too.*

Part D:

Teacher note: In making our analogy between the Church and the human brain, teachers must be cognisant to point out that we do imply that the Church thinks for us but students need to know that the Church does offer reasoned and thoughtful teachings, instruction, guidelines, rules and interpretations for moral living. In many ways the Church is like our conscience than a brain. It is important that teachers help students understand that God has given people free will to choose how to live. In that respect the church does not think for us.

- Have students complete the boxes for the brain and nervous systems after they have completed "How Do You Communicate?" from pg. 29-32 in PSS5.

- Then once the students are finished their answers, direct them to draw the brain and the nervous system on their large body size poster. Have the students transfer and record their answers from the tables next to the labels of the systems on their large body size poster beside the appropriate labels of their drawn organs and systems.

  Example of possible answers:

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What does your brain and nervous system do? *The brain controls all voluntary and most involuntary activities and actions of differing body systems. The brain processes stimuli that come into the body through organs of the nervous systems. The nervous system has a role in the preservation of the body when it comes into contact with danger.*	What part of our church is like the brain? What are the nerves of the church? *The brain and nervous of system are the people that make up the church. Our conscience is the Church which helps people make sense of the world and issues in the world. But ultimately people make the choice.* *The nerves of the church and the sensory organs of the church may be compared to the people or the organizations that respond to the needs in the*

	world. *The brains of the church could be scripture which provide the thoughts and thinking for our faith, teachings which are divinely inspired.*

Part E:

- When the section "How do You Move?" from pg. 32-34 in PSS5 is completed have students fill out the boxes for the musculoskeletal systems.
- Then direct students to add bones and muscle to your body on the large body size poster. Transfer your answers from the tables below onto your large body size poster beside the appropriate labels for the respective organs and systems.

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What does your skeleton do? *The skeleton is a framework which protects the body and internal organs. It is a framework against which the muscles are anchored and function in tandem pairs.*	Who like the skeleton, can keep the church upright? *The skeleton of the church could be scripture which is God's word and church teaching for moral living.* *Literally it could be bricks and mortar to hold up the church building.* *The skeleton could be the people who support the church with their prayers and their works of charity.* *Ultimately it is God who holds the church upright.*
What do muscles do for our bodies? *Our muscles create all the important movements in our bodies from peristalsis to muscle contraction. All movement results because of the muscles.*	Who or what in our church are its muscles? Who can get the work done? *The muscles of the church consist of the community. The actions of the community, to do good in the world, is dependent on the people who moved by and guided by God's Spirit do his work.*

Lesson 2: Organ transplant and Healthy Choices

Description: This lesson is designed to accompany and to complement the Communicate Questions on pg. 37 in PSS5 and relevant sections in Fully Alive, theme As students have read

in PSS5 diseases are conditions that affect their bodies. Diseases may result from lifestyle choices, pathogens like bacteria and viruses, or may be genetic. While people cannot control genetic factors which they inherit from their parents, we can help students understand that they can still make good choices regarding their health.

In this lesson students will also learn about treatments like organ transplants that can contribute positively to people's live. From class discussion students will learn how the church views organ transplant and how these types of medical procedure can positively impact the recipient's life.

Required time: 1 hour.
Instructional Procedure:

- Introduce the concept of medical intervention as a procedure which could be surgery or medicine which is used to help treat illness. Explain to the students the teachings of the Church on medical procedures and organ transplantation CCC2288, CCC2296. Help students understand that medical procedures that benefit people are definitely supported by the church provided the procedure doesn't cause undue risk to the recipient and donor. The church believes that organ donation after one dies is meritorious and very generous. However the church does oppose organ donation that is done against a person's will. Moreover the church does not condone organ transplantation if someone is hurt or mutilated in order to save someone else.

- Read activity 2: Organ transplant. In this activity students will learn about Monique, a resident from Saskatchewan who has undergone kidney transplantation which saved her life and increased her quality of life. Teachers should help students understand that the story is biographical and Monique's last name was left out purposefully to preserve her anonymity. All aspects of her life mentioned in the story are real. Monique willingly shared her story so that students might appreciate the great gift that she received and the gift imparted by the donor who under Saskatchewan law remains anonymous even to the recipient.

- Introduce the strategy 'think, pair, share' as students work through the activity 'Monique's story and questions.

- Have the students pair up to complete the 'think, pair, share' activity. Remind the students of the following guidelines:

    1) During the thinking part of this activity, we must remain very quiet, thinking on the question at hand.

    2) Then sitting face to face beside a partner on place on the floor or quietly in our desks, take one minute each to share your answers. One person actively shows a listening posture and after the one minute, partners switch.

3) Then when the teacher signals for partners to return, assemble in a large group either in a circle on the floor or in your desks. In this part of the activity, the teacher will ask partner groups to share their answers. You will summarize your partners' answers and they will summarize your answers.

- Have students reflect on the Communicate Questions in Pearson Saskatchewan Science 5 on pg. 37. Along with those questions think about the following:

1. How do our Catholic values help us influence the choices we make to keep our bodies free of disease?

Life and physical health are precious gifts entrusted to us by God. We must take reasonable care of them, taking into account the needs of others and the common good. (CCC 2288)

2. What does our Church teach us about medical procedures like Organ Transplants?

Scientific, medical, or psychological experiments on human individuals or groups can contribute to healing the sick and the advancement of public health.

Organ transplants are in conformity with the moral law if the physical and psychological dangers and risks to the donor are proportionate to the good sought for the recipient. Organ donation after death is a noble and meritorious act and is to be encouraged as an expression of generous solidarity. It is not morally acceptable if the donor or his proxy has not given explicit consent. Moreover, it is not morally admissible to bring about the disabling mutilation or death of a human being, even in order to delay the death of other persons. (CCC 2296)

Lesson 3: A healthy spirit, a part of good health

Description: In this students will reflect and consider how spirituality and faith contribute to a healthy balanced life.

Required time: 1 hour

Instructional Procedure:

- Introduce the lesson by asking the key question, "What choices do we make that can contribute to a healthy lifestyle?" Invite student response.
- Ask students to consider the aspects of self. Pose the question, "How do First Nations they view a healthy human person?" and "What are the four aspects of self that elders believe that makes up a person?".
- Invite students to describe the four parts of the self. Challenge students to reflect on the spiritual aspect of their self. Ask the question, "How do you take care of your spiritual self?"
- Introduce activity 2 "Spiritually Healthy". Invite the students to complete a short self-reflection based on the reflection questions.
- Optional: Complete the activity that follows activity 2.

Lesson 4: Puberty and Change

Description: Students are expected to learn about how the body grows and changes from childhood to puberty. This lesson should be taught in conjunction with "How Do You Grow and Change' in PSS5 pg. 30 and with theme 3, 'Created Sexual: Male and Female' in FA. The blackline masters and the text Fully Alive addresses this theme perfectly.

Required time: 1 hour

Instructional Procedure:

Teach the science lesson if possible in connection with the theme 3 in Fully alive which deals with not only faith aspect of puberty and reproduction but also describe the reproductive systems, changes and growth in scientific terms.

Culminating Task:

- In the culminating task students will research the Catholic Church's perspective on the sanctity of the human body. You will create a science and faith pamphlet that describes the perspective of the Church on the human body. In your activity be sure to include:

    a) Descriptions of at least two organ systems
    b) Provide the Church's perspective on the human body
    c) Describe organ transplantation and provide the Catholic perspective on organ transplantation.
    d) Include diagrams of your organ systems. Refer to your large body poster or use internet resources or medical journal to help you. Label the important organs.
    e) Provide 2 quotations about the human body from the bible to support your ideas.

- You may wish to provide a handout that highlights the Church's teachings on the human body and give some example of scripture passages that will help the students in their research.
- Teachers may wish to direct students to resources like PSS5 science text, fully alive, and 'May We Be One' religion text book.

Appendix A: Back line Masters

Activity 1: The Church is like the human body

Writers of the scriptures in the early Church used different ideas and images to help people understand our relationships with God and each other. St. Paul for example used the idea of the body and compared it to the church. And like the different members of the body each of us has our own purpose, job and talent which contribute to the body, the church or society.

How are the various systems of our bodies, connected to each other, like the ways we are connected together as a church?

In the following activity we are going explore how the functions of our bodies from a science perspective will help us understand our church and our faith functions too.

Complete each set of squares in the table below as you have completed the relevant sections in the Pearson Saskatchewan Science 5 textbook. For example, complete the boxes under the heading "Science Understanding: parts of Your Body" and "Faith Comparison: Parts of the Church" after you have completed your respiratory system part 1 and 2 on pg. 17 in your text. Then as directed by your teachers draw the corresponding organ and system on your large body size poster. Put your answers from the tables from the relevant sections onto your large body size poster beside the appropriate organs and systems.

Part A:

Complete the boxes for the lungs after you have completed "Your Respiratory System, Part 1 and 2 from pg. 17-21 in your text. Then as directed by your teachers draw the lungs and respiratory system on your large body size poster. Transfer your answers from the tables below onto your large body size poster beside the appropriate organs and systems.

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What do the lungs and the respiratory do in our bodies? How do they work together?	Who breathes new life into our Church?

Part B:

Complete the boxes for the heart and circulatory system after you have completed "Your Circulatory System" on pg. 22 in your text. Then as directed by your teachers draw the heart and circulatory system on your large body size poster. Transfer your answers from the tables below onto your large body size poster beside the appropriate organs and systems.

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What does your heart and circulatory system do? How do they work together?	Who do you know in your church who is like the human heart? Who can circulate goodness and love within our church?

Part C:

Complete the boxes for the digestive and excretory systems after you have completed "Fuel In, Waste Out" from pg. 26-28 in your text. Then as directed by your teachers draw the digestive and excretory systems to your diagram on your large body size poster. Transfer your answers from the tables below onto your large body size poster beside the labels for these organs and systems.

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What do the digestive and excretory systems do? How do they work in tandem?	What part of our church feeds us? What helps us get rid of the harmful parts of our life?

Part D:

Complete the boxes for the brain and nervous systems after you have completed "How Do You Communicate?" from pg. 29-32 in your text. Then as directed by your teachers draw a brain and add a nervous system to your diagram on your large body size poster. Transfer your answers from the tables below onto your large body size poster beside the appropriate organs and systems.

Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What does your brain and nervous system do?	What part of our church is like the brain? What are the nerves of the church?

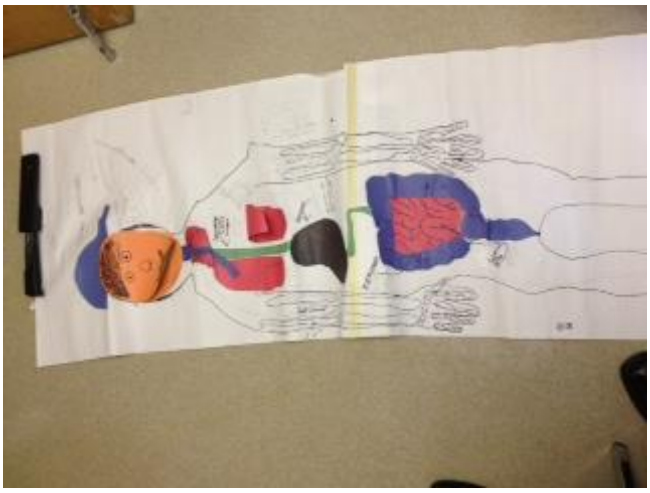
Part E:

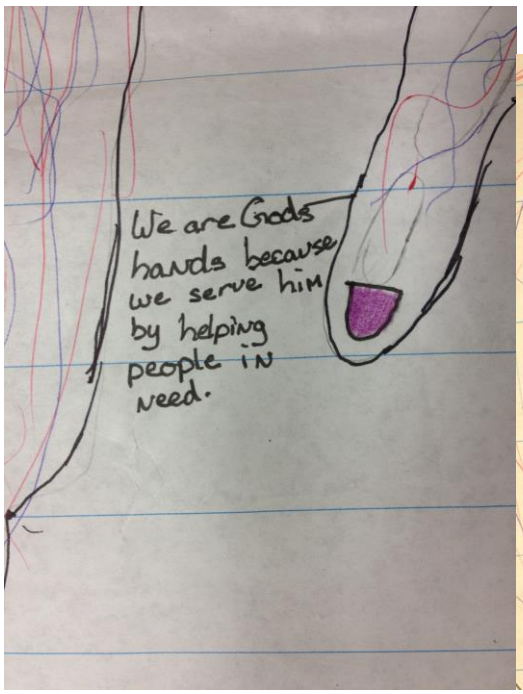
Complete the boxes for the musculoskeletal systems after you have completed "How do You Move?" from pg. 32-34 in your text. Then as directed by your teachers draw bones and muscle to your body on the large body size poster. Transfer your answers from the tables below onto your large body size poster beside the appropriate organs and systems.

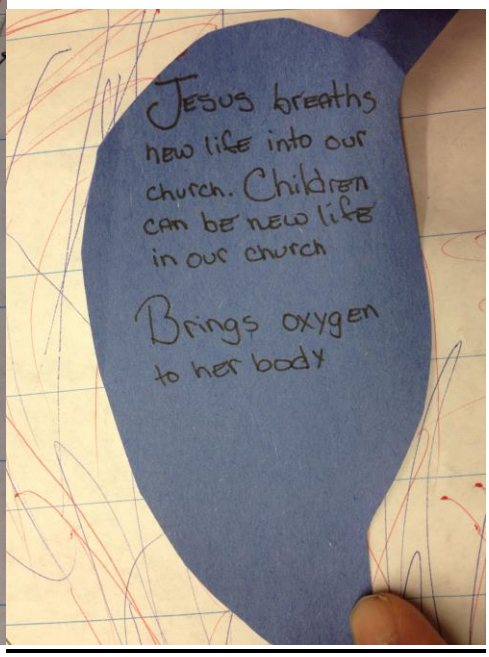
Science Understanding: Parts of Your body	**Faith Comparison: Parts of the Church**
What does your skeleton do?	Who like the skeleton, can keep the church upright?

What do muscles do for our bodies?	Who or what in our church are its muscles? Who can get the work done?

Examples of student work:




We are Gods hands because we serve him by helping people in need.


Jesus breaths new life into our church. Children can be new life in our church
Brings oxygen to her body

Activity 2: Organ Transplant

As you have read in your text diseases are conditions that affect your body. Diseases may result from our lifestyle choices, pathogens like bacteria and viruses, or may be genetic. While we cannot control genetic factors which we inherit that make us sick, we can make good choices. We can limit our exposure to pathogens and reduce our chances of infection by hand washing, regular visits to the doctor and taking the medication that we need. Sometimes however, despite all the good choices we make, our body systems can fail. In such cases we turn to modern medicine for help. An organ transplant is a procedure in which failing organs in the human body are replaced with healthy ones. In this activity you will learn about Monique's story and how a transplant helped improve her quality of life.

Monique's Story:

Monique Ness at the time of her organ transplant

Monique is a Saskatchewan resident who has had two kidney transplants. At the age of 8 Monique with diagnosed with renal failure. In her words, Monique explains, "I wasn't diagnosed with **End Stage Renal Failure** until nearly 17 years old. Positive life choices and thoughts kept me healthy! I didn't get sick until I chose to make poor choices and thoughts." End stage renal failure meant that her kidneys were not cleaning the toxins from her blood. Without the use of her kidneys Monique would die of blood poisoning as the toxins that were usually eliminated by the kidneys, built up to dangerous levels. After her diagnosis, intensive testing took place before Monique was placed on the Canadian registry for organs transplant. She waited some time before her first transplant which went badly and then Monique would another eleven and half years before another healthy kidney match was found. Canadians that need new organs can wait a long time for operations because there are so few organ donors and donor organs need to be the right blood type and antibody match or the body will reject it. Even then, the chances of organ rejection by the body are possible.

While she waited for an organ match, dialysis kept Monique alive. Three times a week, Monique would go to the hospital where a dialysis machine cleaned her blood. In hemodialysis, a machine

filtered the waste from the blood. Another device called fistula was surgically implanted in her forearm under the skin. Rectangular in shape, the fistula looks like a little box one inch by two inches. The fistula was the means to attach the dialysis tubes to Monique. For many years for three to five hours a week, thrice a week, Monique would lie in a hospital bed as the dialysis machine cleaned her blood. "Regina we had the choice of chair or bed. I liked the chair so I could do my math homework!" Monique laughs.

Living without healthy kidneys meant a lot of hardship that Monique had to overcome. First, there were many health issues. Without healthy functioning kidneys, Monique's body couldn't retain many important nutrients and minerals that she needed. The loss of calcium meant the weakening of her bones which could lead to easily fractured bones. As a result types of sports which involved physical injury such as a fall could be detrimental. Hemodialysis also meant that her blood could be exposed to the environment. If the environment wasn't sterile she could become very sick. Moreover hemodialysis posed a problem for regular employment. This meant that she needed a job that could accommodate her regular treatments. Monique became self-employed as computer consultant which meant that she could schedule her work-life around the dialysis. Lastly because of her dialysis, travelling to other places, vacations that we take for granted, was nearly impossible. For Monique to go anywhere for a period longer than three days meant that she had to make arrangements with a hospital to get dialysis.

Since her transplant eight years ago, Monique's life has changed. She still needs regular visits to the doctor to ensure that her new kidney is functioning properly. She needs to take anti-rejection drugs to keep her immune system from attacking her new kidney. She has to be very careful about the diet she has in order to keep herself as healthy as possible. As a result Monique has chosen a vegetarian lifestyle, doesn't smoke or drink and exercises moderately.

"How I eat and live are my choices out of respect and love of life and God. Appreciation is very important to my wellness as well." Monique says.

Monique pursues art, writes and still works. Into one of her pieces of art, Monique has incorporated her fistula as a symbol of beauty and as a reminder to herself about the power of belief to overcome adversity. Above all, Monique continues to hope. Her hope and her spirituality continue to keep her going.

When she was asked what lessons she could give to students who read her story Monique explained, "A kidney transplant is a form of treatment just like hemodialysis or peritoneal dialysis. There are benefits and costs, depending on the person's chosen lifestyle. People need to think it over (talk it over with God) and decide what is best for them. Things started as hope and appreciation. When I **believe** and appreciate that I am divinely guided, that is when things go well."

Monique continues to live her life fully, writing and working in Regina, Saskatchewan.

Questions:

With a partner complete this think, pair, share activity. In a think\pair\share activity we must remember the following guidelines:

1) During the thinking part of this activity, we must remain very quiet, thinking on the question at hand.
2) Then sitting face to face beside a partner on place on the floor or quietly in our desks, take one minute each to share your answers. One person actively shows a listening posture and after the one minute, partners switch.
3) Then when the teacher signals for partners to return, assemble in a large group either in a circle on the floor or in your desks. In this part of the activity, the teacher will ask partner groups to share their answers. You will summarize your partners' answers and they will summarize your answers.

Reflection questions:

1. What challenges did dialysis pose for Monique?
2. How might those same challenges help Monique grow?
3. How did hope keep Monique positive and persevering?
4. The Church teaches that medical procedures like organ transplants which benefit people are important and good. What ways does Monique's story encourage average people to do for social justice?

Reflect on the Communicate Questions in Pearson Saskatchewan Science 5 on pg. 37. Along with those questions think about the following:

1. How do our Catholic values help us influence the choices we make to keep our bodies free of disease?

Activity 3 : Spiritually Healthy

In Science, as you may have read, many cultures believe that good health is a balance of the body, mind, emotion and spirit. For example, traditional Chinese medicine suggests that illness is an imbalance of one of your aspects. First Nations elders teach that people are sometimes out of balance. Sometimes we don't make time to look after our emotions or our spirit. In a busy world we often neglect to pray, to be with God or to focus on our emotional and spiritual well-being.

In this activity we're going to look at ways we can help address the imbalance in our life, find ways to make prayer meaningful and to take time to be with Jesus.

Let's begin by a short self-reflection:

1. Think about your day. Write down all the things that you do.
2. Beside each item write down how much time you spend at each item.
3. Which items bring you joy, help you grow and make you a well-balanced person?

4. Which items might be harmful to you?
5. How might you cut back some unhealthy items to become healthier?
6. Is there five minutes in your day that you could find to be quiet? Being quiet means to still your thoughts and to stop moving.

Challenger Activity:

a) Slow down your breathing. Take long deep breaths and think about one person or one event that day that has brought you joy.

b) Jot a list on paper or mentally make a list of everything today that you are thankful for. What people, what events, what reasons do you have to be thankful? In a simple thought thank God for these things.

Science 5 **Culminating Task:**

Since we are made in the image of God, St. Paul calls the body a 'temple of the Holy Spirit'. As followers of Jesus how are we to treat our bodies? In the following activity, research the Catholic Church's perspective on the sanctity of the human body. Your teacher will provide a handout that provides the Church's teachings on the human body and give you scripture passages that will help you in this task. You may also use resources like your science text, fully alive, and 'May We Be One' religion text book. You will create a science and faith pamphlet that describes the perspective of the Church on the human body. In your activity be sure to include:

f) Descriptions of at least two organ systems
g) Provide the Church's perspective on the human body
h) Describe organ transplantation and provide the Catholic perspective on organ transplantation.
i) Include diagrams of your organ systems. Refer to your large body poster or use internet resources or medical journal to help you. Label the important organs.
j) Provide 2 quotations about the human body from the bible to support your ideas.
k) Describe how the Church's perspectives on the human body affect you and how you might live knowing about these teachings. Are there changes to your life that you would make based on these teachings?

Science 5 **Culminating Task Rubric**

Criteria	**1**	**2**	**3**	**4**
Organ System\	I am missing important information about	I am missing some important information about the organ system	I provided at least three important facts about each organ system.	I provide accurate and relevant facts about each organ system. I included at

Science content	each of the organ systems. I didn't describe the jobs that the organs and organ system do. I paraphrased sources of information but I didn't really understand them	My descriptions about the organ and organ systems jobs are vague.	I accurately described some of the roles the organs and organ system plays. I described the roles in my own words.	least three key facts. I accurately described most of the organ, organ systems and their roles. I described in my own words.
Diagrams	I am missing a diagram. I am missing important parts of the diagram I didn't label my diagram	I've included diagrams but they weren't clearly illustrated. Most of the organs and organ system parts are on the diagram I included some labels	Diagrams were clearly drawn and labelled. All the relevant organs and organ systems are included in my diagram	My diagrams are clearly drawn, labelled and color coded so that it is easy to read. All the organs and organ systems in my diagrams are clearly labelled and correctly written.
Faith\ Catholic perspective	My work is mostly copied from resources because I don't really understand the Church's perspective. I didn't clearly show what the Church's perspective means to me. I forgot to include bible passages about the body as the temple of the holy spirit, made in the image of God, and show other ideas that the bible gives about the human body. I didn't clearly represent the Church's view on organ transplantation.	In my work I mostly rewrote the Catholic teachings on the body. I didn't clearly show what the Church's perspective means to me. I made some vague statements. I picked a couple of bible passages but they didn't support my ideas. I didn't clearly represent the Church's view on organ transplantation	I described most of the Church's teaching and perspectives in my writing quite clearly. I described what the Church's perspective means to me. I picked two meaningful passages that support my ideas. I clearly represented the church's view on organ transplantation.	I described the Church's perspective so clearly that anyone can understand them and appreciate the Church's view. I clearly described what the church's perspective means to me and I show how I can apply them. For example, I choose to exercise because it is good for me. I choose to pray because it keeps me spiritually healthy. I picked two meaningful passages that support my ideas. I clearly represented the church's position on organ transplantation and describe what it means to me as a follower of Jesus.

Appendix B: Table of Correlation

Faith Permeation lesson Documents	Pearson Saskatchewan Science 5	Outcome and Indicator	Catechism of the church	Gospel/ biblical references/ Church documents and	Christian Ethics resources

				encyclicals	
Lesson 1: The Church is Like Human Body **Activity1** "The Church is like a Body". **Part A:** Part B: Part C: Part D: Part E:	"A Healthy Life/Get Started" on page 4. "Your Respiratory System, Part 1" on pg. 17 "Your Circulatory System" on pg. 22 "Fuel In, Waste Out" from pg. 26-28 in PSS5. "How Do You Communicate?" from pg. 29-32 "How do You Move?" from pg. 32-34	HB5.2 a, b,c HB5.3	**CCC2288**	1 Corinthian 12:12 1st Corinthians 6: 19-20 *Ephesians 4:4-6*	**<u>Fully Alive</u>** Theme 5 of Fully Alive, topic 2 'Communities are Like Families' pg. 102-103 pg. 109-115 **<u>May We Be One</u>** Pg. 38 (biblical references to the church community), pg. 24-26 which also describe an aboriginal community in the North West Territory
Lesson 2: Organ transplant and Healthy Choices Activity 2: Organ Transplant Monique's story	Communicate Questions on pg. 37	HB5.2 j HB5.3 a	CCC2288, CCC2296	N\A	The story of the Osbournes. Theme of development- 17 pg. 186 teacher guide May We Be One.
Activity 3 : A healthy spirit, a part of good health	Pg. 7 First Nations and Metis medicines Pg. 51- Ask an Elder Work on it pg. 53			Proverbs 18:14 1 Timothy 4:7-9 Romans 15:13 Isaiah 46:3-4	
Culminating task	"Design Project" pg. 52-53	HB5.1 a, b, i, j HB5.2 a, b, c, k.	**CCC2288**	1 Corinthian 12:12 1st Corinthians 6: 19-20	

				Ephesians 4:4-6	

Appendix C: Catechetical References

Respect for health

2288 Life and physical health are precious gifts entrusted to us by God. We must take reasonable care of them, taking into account the needs of others and the common good.

Concern for the health of its citizens requires that society help in the attainment of living-conditions that allow them to grow and reach maturity: food and clothing, housing, health care, basic education, employment, and social assistance.

2289 If morality requires respect for the life of the body, it does not make it an absolute value. It rejects a neo-pagan notion that tends to promote the cult of the body, to sacrifice everything for it's sake, to idolize physical perfection and success at sports. By its selective preference of the strong over the weak, such a conception can lead to the perversion of human relationships.

2290 The virtue of temperance disposes us to avoid every kind of excess: the abuse of food, alcohol, tobacco, or medicine. Those incur grave guilt who, by drunkenness or a love of speed, endanger their own and others' safety on the road, at sea, or in the air.

2291 The use of drugs inflicts very grave damage on human health and life. Their use, except on strictly therapeutic grounds, is a grave offense. Clandestine production of and trafficking in drugs are scandalous practices. They constitute direct co-operation in evil, since they encourage people to practices gravely contrary to the moral law.

Respect for the person and scientific research

2292 Scientific, medical, or psychological experiments on human individuals or groups can contribute to healing the sick and the advancement of public health.

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.

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.

2295 Research or experimentation on the human being cannot legitimate acts that are in themselves contrary to the dignity of persons and to the moral law. The subjects' potential consent does not justify such acts. Experimentation on human beings is not morally legitimate if it exposes the subject's life or physical and psychological integrity to disproportionate or avoidable risks. Experimentation on human beings does not conform to the dignity of the person if it takes place without the informed consent of the subject or those who legitimately speak for him.

2296 Organ transplants are in conformity with the moral law if the physical and psychological dangers and risks to the donor are proportionate to the good sought for the recipient. Organ donation after death is a noble and meritorious act and is to be encouraged as an expression of generous solidarity. It is not morally acceptable if the donor or his proxy has not given explicit consent. Moreover, it is not morally admissible to bring about the disabling mutilation or death of a human being, even in order to delay the death of other persons.

Science 5
Faith Permeation Essential Connections

Unit Theme: Physical Science –Properties and Changes of Matter

This faith permeation unit concerns the physical properties and changes in matter. The provincial curriculum expects that students will understand and investigate changes of matter, solid, liquid and gaseous states of matter. They will learn that certain processes may change the state of matter. These two primary outcomes do not lend themselves to adaptation for genuine faith permeation.

However, the last outcome, which deals with the way humans produce, harvest and use resources to create manufactured goods, concerns social consequences and social justice. This is a recurring theme of the Saskatchewan science program that often challenges students to consider the consequences of social action or inaction, choices and their ramifications. In terms of faith, we are called to social justice and environmental stewardship by God. Here our faith genuinely coincides with this particular outcome. As result this permeation unit will deal only with the last outcome.

Provincial Curriculum Outcomes and Indicators Addressed:

MC5.3 Assess how the production, use, and disposal of raw materials and manufactured products affects self, society, and the environment

b. Assess the benefits and drawbacks of manufactured materials (e.g., plastic, steel, aluminium, glass, nylon, and other fabric) that have been developed to improve human living conditions.

c. Research a product to determine the raw materials from which it is made and the process required to turn the raw materials into a manufactured product.

f. Identify locations in their communities and in Saskatchewan where agricultural and industrial manufacturing occurs, that products are created and tested, which raw materials are used, and how byproducts and waste are disposed.

g. Assess the societal and environmental impacts of industrial and agricultural processes that change raw materials into manufactured products, taking into account different perspectives such as consumer, manufacturer, salesperson, and community leader.

i. Research cultural values related to the consumption of products, such as using all parts of an animal.

j. Investigate how natural and manufactured products (e.g., tires, computers, trees, garbage, paper, scrap metal, house construction materials, food, clothing, oil, and automobiles) are disposed of personally, in their communities, and in Saskatchewan.

Catholic Faith Focus for Learning:

The Catholic Faith Focus for learning for this unit concerns the value of Catholic Stewardship. In this faith permeation unit students will learn the meaning of Stewardship based on our Catholic beliefs. Students will understand and appreciate how our view of stewardship guides environmental action, social justice and greater enhances our appreciation for the earth that God has entrusted in our care.

Catholic Faith Big Ideas (answers to the essential questions):

Humanity was entrusted with the responsibility to care for the earth, its resources and all its inhabitants. Our choices to use, harvest, mine and exploit different resources must be aligned with this principle: for good of all and to create the least harm to the land.

2402 In the beginning God entrusted the earth and its resources to the common stewardship of mankind to take care of them, master them by labor, and enjoy their fruits.[187] The goods of creation are destined for the whole human race.

2404 "In his use of things man should regard the external goods he legitimately owns not merely as exclusive to himself but common to others also, in the sense that they can benefit others as well as himself."[188] The ownership of any property makes its holder a steward of Providence, with the task of making it fruitful and communicating its benefits to others, first of all his family.

2405 Goods of production - material or immaterial - such as land, factories, practical or artistic skills, oblige their possessors to employ them in ways that will benefit the greatest number. Those who hold goods for use and consumption should use them with moderation, reserving the better part for guests, for the sick and the poor.

2415 The seventh commandment enjoins respect for the integrity of creation. Animals, like plants and inanimate beings, are by nature destined for the common good of past, present, and future humanity.[195] Use of the mineral, vegetable, and animal resources of the universe cannot be divorced from respect for moral imperatives. Man's dominion over inanimate and other living beings granted by the Creator is not absolute; it is limited by concern for the quality of life of his neighbor, including generations to come; it requires a religious respect for the integrity of creation.[196]

Catholic Faith Essential Skills:

- Students will be able to describe the Catholic value of stewardship.
- Students will understand what it means to be a good steward of the earth.
- Students will create an action plan which is guided by these values.

Catholic Faith Essential Questions:

1) What is Catholic stewardship?
2) What does it mean to be a good steward?
3) How does this value guide the way we treat the earth?

Lesson 1: Stewardship in Manufacturing

Description: This lesson helps students explore ways that people need to become environmental stewards in the manufacturing of goods and products in Saskatchewan. It asks students to consider the benefits to people and the harm that manufacturing products might entail from a Catholic stewardship perspective. By the end of the lesson students will be able to describe the Catholic perspective on stewardship and to apply to the manufacturing of goods in Saskatchewan.

Required time: 1 hour

Teacher note: To be taught in conjunction with the activity ‘Work On It” on PSS5 pg. 99 and 101.

Instructional Procedure:

- Introduce the handout Activity 1: Environmental Stewardship and the activity ‘Work On It’ on page 99 in PSS5 simultaneously. Activity 1 is meant to complement ‘Work On It’ on pg. 99 and pg. 101.
- Read activity 1 with the students. The reading is a brief introduction to the Catholic belief in Stewardship. After a brief discussion, have the students use the question suggested in activity 1 to complement the questions found in the ‘Work on It’ activity.
- Ensure that students a few slides to their slide show or provide information on their poster about the Catholic perspective on stewardship.

Culminating Task: Design project

- In the design project in PSS5 students are asked to create and design a product that will be the solution to a problem. In groups the students create a short presentation to describe the product, describe their process, show off their prototype and summarize their findings.
- The design project in PSS5 does not consider the moral and social implications in the manufacturing of goods. This culminating task will add that dimension to the project.
- To make this project more authentic students will be asked to consider the following:
  a) How does the production of your product follow the principles of stewardship?
  b) Explain the ways t your product benefits people and minimizes the harm to people and the environment.
  c) If there is an environmental audit made to your product, how will it pass an environmental inspector's assessment? Give reasons how your product will be environmentally friendly.
  d) Explain how your product is a green product and follows the green standards set by the government of Canada.

Appendix A: Black Line Masters

Activity 1: Environmental Stewardship

Introduction:

We believe that the earth and all on it are gifts from God. We believe that we don't truly 'own' the earth, that it all belongs to God and he entrusted us to care for the earth and all of its resources. This responsibility and belief is called stewardship. It is the basis of our Catholic teaching on the environment.

Where do we learn about stewardship in the bible?

In the bible it says in Genesis that God gave people 'dominion over the land' and to master it by labour. These were words that were used in many translations of the bible. And while we believe that the scripture writers and translators of the early bibles were divinely inspired, they used words that reflected their understanding of the world at that time. The words 'dominion' and 'master' implies that we are somehow the owners over creation, which is not true at all. Once it was believed that we could possess the earth but that isn't the case today. The Catholic Church teaches that private ownership of property and resources can be legitimate but only happens under the law and because God has given us those gifts. Moreover the Church teaches that with the wealth and prosperity that comes with ownership and resources, we must share that wealth with the poorest among us and for the good of all people.

Are you a good steward?

As you have learned in your readings in Pearson Saskatchewan Science 5, there are benefits and drawbacks in manufacturing of goods. Our views about how we should use the land vary from person to person. You have learned that many cultures, like the First Nations of Saskatchewan,

have a deep respect for the land and are guided by those beliefs. Similarly our beliefs about stewardship may guide our actions in this respect. In this activity you will discuss choices and debate the benefits and drawbacks of the following manufactured goods made in Saskatchewan but you will use principles of stewardship to guide your arguments and decisions.

Consider the list of goods and materials on pg. 99 of your science text. Complete the activity 'work on it' found on that page. However when you research and gather information about that topic consider these questions in addition to the question in the procedure in the activity 'work on it'.

Questions to consider:

a) Does the harm in the production of these goods outweigh their worth?
b) How could we minimize the damage to the environment when we produce these goods?
c) Is the production of these good environmentally sustainable?
d) How are the profits of these goods used? Do the companies that make them give back to the community?
e) Does the production of these goods impact the health and well-being of the people making them?
   Remember good stewardship:
   a) Considers the good of society and the well-being of people , animals and the environment
   b) Benefits all people not just the few
   c) Manages carefully the gifts that God gave us
   d) Thinks about future impacts on the world and its people

Appendix B: Table of Correlation

Faith Permeation lesson Documents	Pearson Saskatchewan Science 5	Outcome and Indicator	Catechism of the church	Gospel/ biblical references/ Church documents and encyclicals	Christian Ethics resources
Lesson 1: Stewardship In manufacturing	Work on it pg.99 and 101	MC5.3 b,c,f,g,i,j	2402, 2204, 2205, 2215		MWBO- Unit 7: The church acts justly.

Appendix C: Catechetical References

2402 In the beginning God entrusted the earth and its resources to the common stewardship of mankind to take care of them, master them by labor, and enjoy their fruits.[187] The goods of creation are destined for the whole human race.

2404 "In his use of things man should regard the external goods he legitimately owns not merely as exclusive to himself but common to others also, in the sense that they can benefit others as well as himself."[188] The ownership of any property makes its holder a steward of Providence, with the task of making it fruitful and communicating its benefits to others, first of all his family.

2405 Goods of production - material or immaterial - such as land, factories, practical or artistic skills, oblige their possessors to employ them in ways that will benefit the greatest number. Those who hold goods for use and consumption should use them with moderation, reserving the better part for guests, for the sick and the poor.

2415 The seventh commandment enjoins respect for the integrity of creation. Animals, like plants and inanimate beings, are by nature destined for the common good of past, present, and future humanity.[195] Use of the mineral, vegetable, and animal resources of the universe cannot be divorced from respect for moral imperatives. Man's dominion over inanimate and other living beings granted by the Creator is not absolute; it is limited by concern for the quality of life of his neighbor, including generations to come; it requires a religious respect for the integrity of creation.[196]

Science 5
Faith Permeation Essential Connections

Unit Theme: Forces and Simple Machines

The provincial science curriculum mandates that students must learn about simple machines, types of simple machines, the mechanical advantage these devices. While the bulk of the outcomes in this unit does not lend itself to faith permeation, some indicators ask students to explore how past cultures and societies used simple machines to build. Therefore in this unit students will learn how simple machines were used to build churches and cathedrals.

Provincial Curriculum Outcomes and Indicators Addressed:

FM5.3 Assess how natural and man-made forces and simple machines affect individuals, society, and the environment.

b. Compare technologies developed and/or used by various cultures, past and present, which represent applications of simple machines.

i. Research the use of inclined planes and other simple machines used to construct structures such as pyramids, Stonehenge, Easter Island moai, tipis, inukshuks, and totem poles.

Catholic Faith Focus for Learning:

The more import of the two faith learning foci of this unit centers on the appreciation for the human and financial cost that natural forces have on natural and constructed environments. Students will learn the meaning of social justice and about how we as catholic are asked to respond towards others in the aftermath of natural destructive forces.

The second faith focus examines how people of faith used simple machines and technology to build cathedrals and churches.

Catholic Faith Big Ideas (answers to the essential questions):

- Simple machines like levers, pulleys, wedges and inclined planes merged into complex machines like cranes were used by people of medieval and renaissance periods to build some of the most elaborate cathedrals in the church's history.

Catholic Faith Essential Skills:

- Students will explore the ways that people from the middle ages used simple and complex machines to construct churches and cathedrals.

Catholic Faith Essential Questions:

1) How did simple and complex machines help build churches and cathedrals from medieval and renaissance periods?

Lesson 1: Churches, cathedrals and simple machines.

Description: In this lesson students will explore how simple machines made into more complex machines like cranes help in the construction of cathedrals and churches in medieval Europe. This lesson is to be taught in conjunction with section 13 of PSS pg. 156.

Required time: 1 hour

Teacher notes: Teachers and students explore the simple and complex machines used by European craftsmen and laborers during the Middle Ages and the Renaissance that they used to build churches and cathedrals. This lesson could also be modified into an inquiry activity in which student research and report on simple and complex construction machines from the Middle Ages.

Instructional Procedure:

- Review relevant sections on simple machines with the students. This lesson can be taught after all pertinent sections about simple machines are taught.
- Introduce the lesson with the clip: The Medieval Mind- How to Build a Cathedral (BBC). In this clip at about 5:13 minutes there is a medieval drawing of a cathedral's construction. Have the students pick out as many simple machines as they can from the clip. Students will see wedges in the form of a pick ass used to shape and cut stone, wedges in the form of saws. Students will see workmen using long beams and poles as

levers. A pulley system is depicted in a drawing at 8:10 sec. Another pulley and hammer are depicted later on at 30 minutes.

- Discuss what students observed in the depictions of the laborers at work. Ask: What simple machines did you observe?"

**If the clip is not available please use the alternate sites for pictures and references:

a) http://cburrell.wordpress.com/2011/03/02/building-in-the-middle-ages/ (simple tools, simple machines and complex machines- cranes)
b) http://www.veproject1.org/vepprograms.htm (winches, cranes, pulleys and gears)
c) http://www.machine-history.com/node/554 (treadmill using gears and pulleys)
d) http://www.scribd.com/rhaddlesey/d/2626618-r-haddlesey-virtual-meccano
e) http://www.medievalists.net/2010/10/02/medieval-masons-tools-the-level-and-the-plumb-rule/ (winch)
f) http://lostbiro.com/blog/?p=1155 (medieval crane)

- The play a video from the website: http://www.veproject1.org/party.htm. In the short clip gears and pulleys working together create a complex machine, the winch. The winch was used to convey very heavy loads. A complex machine, the tree stump puller, uses wheels and gears to magnify horsepower by eight times. This machine was used for pulling tree stumps from the ground. A third complex machine called, the great winch, consisted of a series of gears. A handle, acting as a lever, was used to drive the gear system in the. The last complex machine illustrated in a crane.
- Have the students compare and contrast the simple machines used during the middle ages to the simple machines used by the Egyptians during the construction of the pyramids. Ask, "How is their construction similar and how are they different?"
- Use a Venn diagram format to compare and contrast the differences.

Appendix A- Table of Correlation

Faith Permeation lesson Documents	Pearson Saskatchewan Science 5	Outcome and Indicator	Catechism of the church	Gospel/ biblical references/ Church documents and encyclicals	Christian Ethics resources
Lesson 1: Churches, cathedrals and simple machines.	How do Inclined planes work? pg. 156	FM5.3 b, i	N\A	N\A	N\A

** Note- no catechetical references, scripture, song or encyclicals for this unit.

Science 5
Faith Permeation Essential Connections

Unit Theme: Weather

In the weather unit students will learn about weather phenomenon and climate. They will learn about weather related technologies and these technologies help humans predict the weather. Most of the provincial outcomes in this unit are not easily correlated to faith permeation however, the last outcome and its indicators, WE5.3 provides several opportunities for faith permeation. In this unit students will examine the social impact that weather phenomenon like hurricanes, tornadoes and storms have on people and how the church and its people respond. They will learn how weather phenomenon like the wind can be analogies for understanding God, life and covenant.

Also the lessons in this unit can also address outcome 3 from the forces and simple machines unit- FM5.3. See below.

Provincial Curriculum Outcomes and Indicators Addressed:

FM5.3 Assess how natural and man-made forces and simple machines affect individuals, society, and the environment.

c. Analyze the effects of forces from natural phenomena (e.g., earthquake, tornado, hurricane, and tsunami) on the natural and constructed environment.

WE5.3 Analyze the impact of weather on society and the environment, including technologies that help humans address weather conditions.

c. Analyze the impact of weather conditions for a particular region on the lives and livelihoods of people in that region, including choices of food, shelter, clothing, transportation, and employment.

d. Research effects of short- and long-term changes in weather on the lives and livelihoods of people locally, nationally, and globally.

e. Relate weather conditions, and changing weather conditions, to the activities and behaviours of animals.

f. Explain the effects of different types of severe weather on people, communities, and the environment, including personal safety preparations for various severe weather events.

h. Research traditional and contemporary technological innovations and products related to clothing, shelter, agriculture, and transportation that various cultures have developed to address various types of weather conditions.

Catholic Faith Big Ideas (answers to the essential questions):

- In the Old Testament weather events like the wind, rain and hail may be used as signs from God, are directed and sustained by Him. These events are shown to both benefit and harm people. In many sections these weather events are viewed as punishments from God to punish sinners.
- Our modern view of weather events is different of the cultural views that ancient the Hebrews held. Although the Catholic Church teaches that God who created everything from nothing and sustain all things, and though He could cause the miraculous to occur, he neither directs nor wills natural disasters such as Hurricane Katrina. Natural disasters are the result of natural phenomenon and are not the result of God's wrath or his judgement upon His people. In the historical past, such as in biblical times, before the advent of modern science, people may have viewed natural disasters as God's punishment upon people but today science has helped to understand that tornadoes and hurricanes, for example, are the result of severe weather patterns and that many medical conditions and diseases are the result of pathogens.
- Our response to catastrophes and naturals disasters consists of prayer, providing financial and physical assistance. We're called by God to come together to support each other. "Solidarity helps us to see the 'other'-whether a person, people or nation-not just as some kind of instrument, with a work capacity and physical strength to be exploited at low cost and then discarded when no longer useful, but as our 'neighbor,' a 'helper', to be made a sharer on a par with ourselves in the banquet of life to which all are equally invited by God." Pope John Paul II
- Biblical and Scientific explanations of natural phenomena, like wind and rain need not be incompatible. Science uses empirical evidence, such as weather patterns, temperature, humidity and technology like satellites and weather models to explain and predict (with some reliability) weather events. These indeed have their usefulness but they may not provide a strong sense of connectedness to Creation and reverence for nature that spiritual understanding and a subsequent awe for God's creation might provide. It is faith that provides the basis for this respect. It is in our awe for what God has made that makes us appreciate our humanity and realize our mortality in the aftermath of a disaster.

Catholic Faith Essential Skills:

- Students will understand how weather and weather related phenomena such as wind, rain, hail are used in scripture to help people understand God and His workings in the world.
- Students will understand the need to have both a scientific explanation and faith explanation of natural events.
- Students will understand that as a result of scientific explanation and understanding, modern peoples now have a different explanation of weather events. i.e. that we no longer believe that storms and disasters are willed by God as punishments.
- Students will be able to describe and explain our response as Catholics to help people who are victims of natural phenomenon such as storms, hurricanes etc.

Catholic Faith Essential Questions:

1. How are symbols like wind, rain and other weather events shown in the bible?
2. How does the church believe about natural disasters that result from weather events?
3. What is our response as Catholic to natural disasters that result from weather events?
4. How are faith based and scientific explanations about weather compatible?

Lesson 1: Weather related images of God in scripture

Teacher notes: This lesson should be taught after students have finished sections 1-3 in Pearson Saskatchewan science pg, 170-183. Ensure that students have a clear scientific understanding about weather before proceeding.

Description: In this lesson students will learn about biblical and scriptural explanations of weather in the bible and how these explanations do not necessarily conflict with scientific explanation. What students need to know is that spiritual explanations of natural phenomena, such as attributing weather to God, have their merit. These explanations connect us with the natural world, and our place in Creation. They give us a profound respect and sense of stewardship for the gifts that God gives us through the earth. But add to that sense of respect, the gift of reason, through science, we have a second empirical way to predict and explain meteorological events.

Time required: 1 hour

Instructional Procedure:

- Ensure that each student has a copy of activity 1: Weather related images of God in scripture.
- Have students recall or retell the inciting activity 'Looking Forward' in PSS pg. 171.
- Ask the question: "If we didn't know about scientific explanations of weather, how might we explain the weather that happens around us?"
- Invite students to share ways that their parents may have helped them understand weather events such as frightening storms, calm sunny weather etc when they were young children.
- Ask: "Why were these stories told to children?" Invite student responses.
- Ask: "Do these explanations have their place? What were the reasons for them?"
- Ask: "If explanations about the weather such as the stories your parents told you when you were children, are not scientifically correct does it make them less worthwhile? Why or why not? Think about these questions as you do activity 1."
- Allot time for the students to work on this activity individually or in partners.
- Invite students to respond. Discuss answers with students. Help students understand that cultural and spiritual explanations of weather have merit. These explanations give people a connection to nature, to God, to appreciate the world around them and to instill a deeper sense of respect for the earth around them.

Supplementary activity:

Along with the section on 'Sayings and Rhymes' on pg. 194 teachers may share biblical sayings about weather that come from scripture. See appendix A "Biblical Weather Sayings."

Lesson 2: Natural Disasters

Teacher notes: To be taught in connection to section 9 "Severe Weather" in PSS5 pg. 204. It is important that teachers communicate a few key ideas:

1) We as Catholics believe that God created all things and sustains all things with his love. In their science text, students learned that meteorological events such as blizzards and hurricanes are the result of natural weather systems. Ancient people did not have a system of science that helped explain the world. Without a system of research and observation, testing and experimentation, religious ideas dominated. They gave people answers to questions about natural disasters to help explain what happened to ordinary people.
2) The Hebrews and then later the early Christians like other ancient peoples believed that weather events were God's work. They believed that God willed and sent calamities to punish the wicked. While we believe that God has the power to control and affect weather, the holy church does not support the belief that natural disasters today are punishments from God. With the advent of science and technologies we have a better understanding of the natural causes for storms, tornadoes, hurricanes and tsunamis. A view, that God would punish or even test faith through hurricanes and tornadoes, suggests a wrathful God, rather than the image of Christ who is mercy and love.

Description: While science is able to describe and explains the impact that natural forces like hurricanes, tornadoes and earthquakes may have on human made and natural structures, science can't describe the social and economic consequences left in the wake of these disasters. This lesson will help students understand how we as Catholic must respond with faith and hope to alleviate suffering after such natural disasters.

Required time: 1 class

Instructional Procedure:

- Introduce meteorological or geological forces that create the perfect conditions for a natural disaster.
- Describe some of the natural disasters that have struck the parts of the earth within the last few years and the efforts of the church to help mitigate their impact. The earthquake and tsunami in Japan, Hurricane Katrina, tornadoes in Midwestern United States are some examples. The following links provide some examples from which to draw:

a) http://www.catholicfreepress.org/vatican/2011/11/11/at-audience-pope-appeals-for-victims-of-flooding-around-world/
b) http://ncronline.org/news/global/natural-disasters-2011-prompt-outpouring-charity
c) http://www.asianews.it/news-en/Italian-missionary-and-lay-Catholics-help-natural-disaster-victims-in-Yogyakarta-20544.html

- In partners, have students do a think, pair, share activity to generate some ideas what some lasting consequences might be of these forces. Have students respond to the questions:
  a) What are the long-term impacts of these disasters on people, on societies and on the environment?
  b) What was the response of the Catholic community in these examples?
  c) What can we do to help?
  d) Are there examples

- Have partners report their discussions to the class and invite the class to respond to these ideas.
- As students share and the class debriefs, ask the questions, "How do we as followers of Jesus, need to respond when a natural disaster like a tornado, hurricane or earthquake hits?"
- Help students realize that:
  a) Although the Catholic Church believes that God created and sustains all things, the holy church does not support the belief that natural disasters are punishments from God. The bible does contain passages where ancient peoples believed that God willed and sent calamities to punish the wicked but their worldview was dramatically different. Without a system of research and observation, testing and experimentation, religious ideas dominated. They gave people answers to questions about natural disasters to help explain what happened to ordinary people. With the advent of science and technologies we have a better understanding of the natural causes for storms, tornadoes, hurricanes and tsunamis. A fundamentalist view, that God would punish or even test faith through hurricanes and tornadoes, suggests a wrathful God, rather than the image of Christ who ushers in a new covenant of mercy and love.

  b) When natural disasters occur, we as Catholics, turn to prayer, to the sacraments, to our faith and our belief for guidance and for comfort. Our first response is to console and to pray.
  c) Coupled with prayer, our next response must be in the relief of suffering where we can through action like donations, rebuilding, education etc.
  d) Pope Benedict rather, stated that natural disasters help us to reflect about what is important in life.
- Ask, "Was there a time, during a natural disaster that you saw on television or experience, that moved you to action? How did you respond?"
- Have students share their findings after they complete activity: How do we help victims of natural disasters?

Appendix A: Black line Masters

Activity 1: Weather related images of God in scripture

In your science textbook, you shared weather stories about how the sky seemed alive to you. You were asked if you remembered and could share a time when the sky seemed alive. How the sky seemed alive to

Hebrews when they left Egypt in the exodus or what how it might have looked when the rains came down during the great flood. Without science to help explain some of those phenomena how might we explain weather?

We like the Hebrews may explain weather events as acts of God. Sometimes we still do. Throughout the centuries, the scripture writers have tried to help their people to make sense of the world and to help their people see how God works in the world. One way that God was seen working in the world was through events in peoples' daily lives like weather. For example, when they tried to understand why the wind blew or how a rainbow formed, they attributed them to God. Our faith allows us to know that God could cause the wind to blow or to rain to fall. Yet equally miraculous, was God's gift of reason to people. That reason has become the basis for science, as another way to explain what happens in the world. As science and technology evolved, we have different ways to explain how weather occurs for example. Without a clear scientific understanding of these events, ancient peoples explained them in the most real way they knew. Their explanation is no less valid than a scientific one; it was simply a different way to view the world. We believe that God can perform the miraculous but we're thankful that we have another way to explain ordinary natural events. In this lesson you will learn about how the ancient Hebrews viewed different weather events.

Instructions:

With a partner look up the following biblical passages and answer the discussion questions below.

Exodus 10:13

_____

_____

Genesis 7:4

_____

_____

Exodus 9:33

_____

_____

Pick one of the passages shown above and answer the following question below.

Questions:

1. How is the weather event depicted in this passage?
2. How might a scientist view this event?
3. In what way(s) is a biblical or spiritual view of a weather related event no less valid than a scientific one?

4. In a Venn diagram illustrate how a ways biblical explanation for weather related events differ from a scientific one? What are the merits to both?

Appendix B: Activity 1 Answer Key

Weather related images of God in scripture

Exodus 10:13

So Moses stretched out his staff over Egypt, and the LORD made an east **wind** blow across the land all that day and all that night. By morning the **wind** had brought the locusts;

Genesis 7:4

Seven days from now I will send rain on the earth for forty days and forty nights, and I will wipe from the face of the earth every living creature I have made."

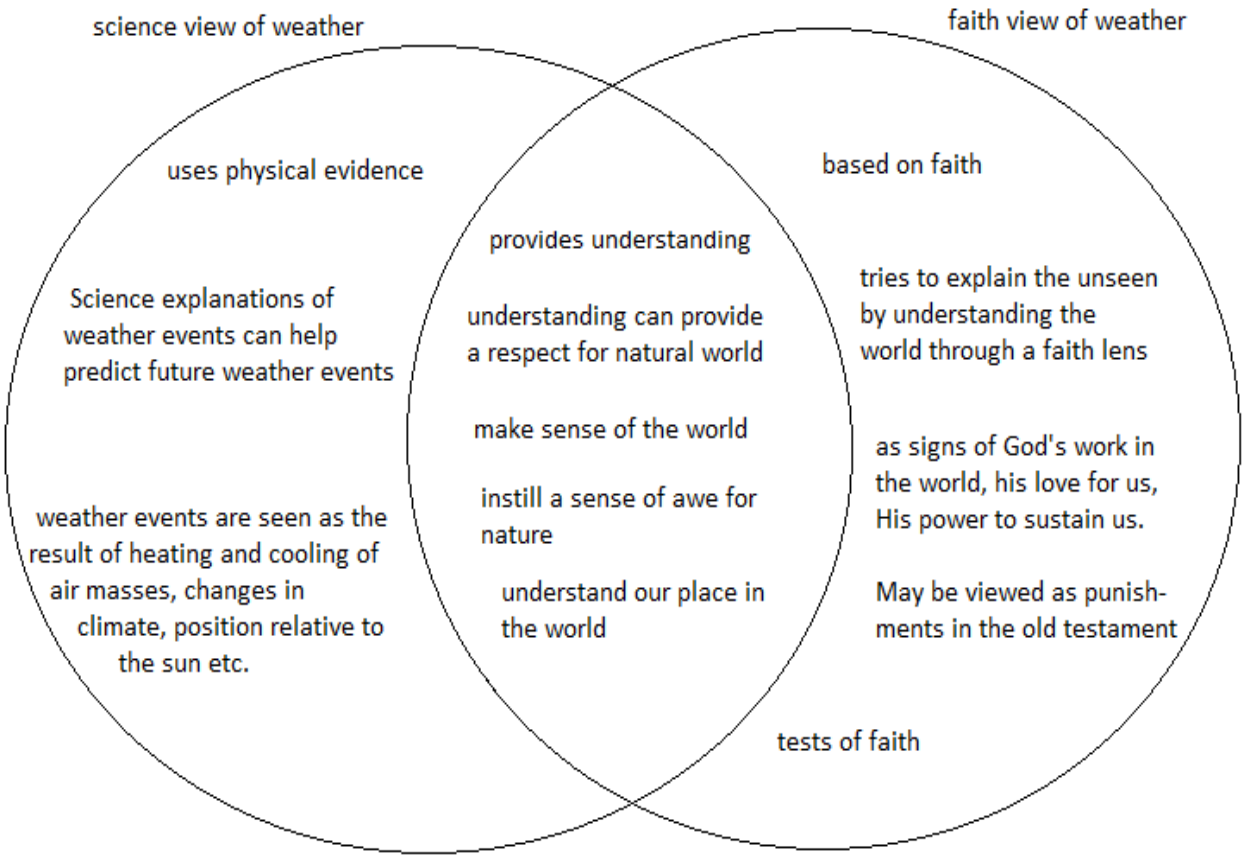
Exodus 9:33

Then Moses left Pharaoh and went out of the city. He spread out his hands toward the LORD; the thunder and hail stopped, and the rain no longer poured down on the land.

Pick one of the passages shown above and answer the following question below.

Questions:

1. How is the weather event depicted in this passage?
    - Weather events are shown as punishments as in the case of the great flood.
    - In other passages the weather events are work at God's will.
    - The weather events test a person's faith.
2. How might a scientist view this event? Scientist view weather events as the result of heating and cooling air masses, the rise in levels of humidity and changes in climate, the earth's position to the sun.
3. In what way(s) is a biblical or spiritual view of a weather related event no less valid than a scientific one? A spiritual view of a natural event has validity because it helps a people explain the world in the way that makes sense to them. The particular cultural explanation helps people to explain their place in the world relative to the natural world. A cultural explanation provides awe and reverence for nature and therefore, there is also respect for nature.
4. In a Venn diagram illustrate how a ways biblical explanation for weather related events differ from a scientific one? What are the merits to both?



Appendix B: Table of Correlation

Faith Permeation lesson Documents	Pearson Saskatchewan Science 5	Outcome and Indicator	Catechism of the church	Gospel/ biblical references/ Church documents and encyclicals	Christian Ethics resources
Lesson 1: Weather related images of God in scripture	Sections 1-3 in Pearson Saskatchewan science pg. 170-183.	FM5.3 c WE5.3 c,d,e,f,h	CCC 338, 310	Exodus 10:13 Genesis 7:4 Exodus 9:33	N\A
Supplementary activity :	Sayings and Rhymes Pg. 194	FM5.3 c WE5.3 c,d,e,f,h	CCC 338, 310	Matthew 16:2 Job 37:22 Job 36:33	N\A
Lesson 2:	Sections 9-11 pg. 204-210	FM5.3 c WE5.3	CCC 338, 310	Genesis 9:8-17	MWBO pg. 127 - story of Noah used as a reflection on God's work in the old

		c,d,e,f,h			testament and His pledge never to harm people in order to destroy evil.

Appendix C: Biblical Weather Sayings

- Matthew 16:2- He replied, "When evening comes, you say, 'It will be fair weather, for the sky is red,'. (What saying is similar to this one? Red sky at night….)
- Job 36:33 His thunder announces the coming storm; even the cattle make known its approach.
- Job 37:22 Out of the north comes golden splendour; around God is awesome majesty.
- Job 37:9 The tempest comes out from its chamber, the cold from the driving

Appendix D: Catechism of the Catholic Church

Nothing exists that does not owe its existence to God the Creator. The world began when God's word drew it out of nothingness; all existent beings, all of nature, and all human history are rooted in this primordial even, the very genesis by which the world was constituted and time begun. (CCC338)

But why did God not create a world so perfect that no evil could exist in it? With infinite power God could always create something better.[174] But with infinite wisdom and goodness God freely willed to create a world "in a state of journeying" towards its ultimate perfection. In God's plan this process of becoming involves the appearance of certain beings and the disappearance of others, the existence of the more perfect alongside the less perfect, both constructive and destructive forces of nature. With physical good there exists also *physical evil* as long as creation has not reached perfection. (CCC310).

<u>Prayer for Victims of the Mudslides and Earthquake</u>, by: Education for Justice

God of all Creation,

Again we hear the wailing of mothers who have lost their children;
Again we hear the screams of injured people,
And the silence of those being pulled from the rubble, from the mud.
Again we catch a glimpse of the poverty
So many in this world live in;
Again we see families without food and water,
In a world with so many resources.

God, embrace those who suffer,
Give them solace and
Support them in their grief.
Keep our eyes and our hearts open.

Prayer for Victims, by: Education for Justice

Compassionate Lord, we pray for those
Who have been devastated by recent natural disasters.
We remember those who lost their lives.
Have mercy on their souls.
We hold in our hearts
Families whose homes have been lost.
Bring them consolation.
Move us to offer aid and support
To help rebuild houses and lives,
Especially for those in poverty,
In the U.S., in Haiti, and
Through the Caribbean.
Keep our hearts open to the development needs of all.
Amen.

Resources:

http://www.maryknollsocietymall.org/studyguides/10447_112.pdf