Name: _____ Group: _____

# THE PROJECT

SIMULATION EXERCISE

**FOR IMMEDIATE RELEASE**

## NEWS RELEASE

The Cinemaniac film production company is spending one million dollars on an animated film that takes place inside the human body. According to the plot summary, two adventurers play the role of nutrients travelling through the body.

Famed screenwriter Sebastian Prince wants to teach lovers of animated film about the workings of the human body through the adventures of his characters. “We're working with a team of film animators to get the scenes just right for our travelling heroes. To make things as realistic as possible, research teams will be training the animators by explaining to them the functions and processes of the organs and systems in which our characters are literally transformed as they voyage through the body,” he explains.

Several four-member research teams have been assigned to design models showing how the systems of the human body function. In the first scene, the characters discover the world of the human body by entering the digestive system. One team of researchers is illustrating the chemical transformation of food. Another team is depicting its mechanical transformation. The other teams are modelling the respiratory and cardiovascular systems through which the characters will pass before witnessing a viral attack in the lymphatic system. "We're thrilled to be working with the research teams because many factors are at play in designing the sets. The sizes, proportions, functions and colours of the organs are all considerations in this design work. The research teams will provide the information we need to inspire our drawings," explained Joseph Taha, one of those involved in making the film.

In the final scene, the characters are trying to leave the human body via the excretory system (which includes the urinary system and sweat glands). Another research team has been assigned to model this system, which will be the backdrop for this action-packed scene.

In total, the research teams are working on models for five systems: the digestive system (chemical and mechanical transformation), the circulatory system, the cardiovascular system, the lymphatic system and the excretory system (urinary system and sweat glands).

"This is a big, challenging project and it would have been impossible to make this film if it weren’t for the funding we've received from federal, provincial and local governments," producer Myriamme Denier said at the press conference. The film will be released in fall 2010.

– 30 –

Source: Anne Jones
Publicist

In this project, you are to play the role of one of the researchers.

Name: _____ Group: _____

# CREATING THE CONTEXT

## I ask myself questions

**1.** What is a model?

**2.** Why does it help to make a model?

**3.** What is a system?

**4.** What questions do you need to answer before making your model?

**5.** What questions do the film animators need to answer before they can create the animated film sets?

Name: _____ Group: _____

# CREATING THE CONTEXT *(continued)*

## I must

**6.** Reformulate the goal of the project in my own words.

_____

_____

## I think

**7.** What do you think is the best way to model a system so that it is clear for the film animators (diagram, poster, 2D model, 3D model, drawing, etc.)?
Justify your choice.

_____

_____

**8.** What factors do you think will influence your choice of objects or materials for creating your model? Justify your answer.

_____

_____

## What I know and what I must find out

**9.** Write down the information you have and the information you need.

| What I know . . . | What I must find out . . . |
|---|---|
| | |

Name: _____ Group: _____

# CREATING THE CONTEXT *(continued)*

## I prepare my work

**10.** Where will you find the information you need to create your model?

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_____

_____

**11.** List the main steps of your project in chronological order.

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## Reflection

| | Yes | No |
|---|---|---|
| Do I clearly understand what I have to do? | ☐ | ☐ |

Name: _____ Group: _____

# GATHERING INFORMATION

## I do research

Before making a plan for your model, gather all the necessary information about your chosen/assigned system.

**1.** In the table below, identify the components of your system and describe their functions. Find objects to help you model them.

**System:** _____

| System component (organ, tissue, gland, etc.) | Functions | Objects to use in model |
|---|---|---|
| **Example for the digestive system:** ***Mouth*** | **Examples:** – ***Chews food*** – ***Mixes food with saliva*** | **Examples:** – ***Plastic dentures*** – ***Nutcracker*** |
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Name: _____ Group: _____

# GATHERING INFORMATION *(continued)*

**2.** In the table below, describe how your chosen/assigned system functions. Find objects to help you model the system.

**System:** _____

**Presented by:** _____

| System functions | Description | Objects to use in model |
|---|---|---|
| **Example:**<br>***Peristalsis*** | **Example:**<br>***The circular muscles of the esophagus, stomach and intestines contract in succession to propel food from one end of the digestive tract to the other.*** | **Examples:**<br>– ***Tube of toothpaste: press the tube and the paste slides to the end of the tube and out.***<br>– ***Nylon stocking with ball inside: squeeze and push the ball along the inside of the stocking.*** |
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Name: _____ Group: _____

# GATHERING INFORMATION *(continued)*

## I apply my research results

**3.** What objects or procedure will you use to model your system? Explain briefly.

_____

_____

_____

**4.** How will you represent your system? Explain briefly.

_____

_____

_____

**5.** Can this approach be used to model every component of your system? If not, what changes could you make?

_____

_____

**6.** Does this way of modelling your system make it easier to understand how it functions? If not, what changes could you make?

_____

_____

**7.** Draw up an inventory of the materials for making your model.

_____ _____

_____ _____

_____ _____

**8.** Tick off the factors below once you have considered them for choosing your materials.

- ☐ Availability of the materials
- ☐ Size of the tissues, organs or glands
- ☐ Weight, size and price of the objects to use in modelling your system
- ☐ Proportions of the tissues, organs or glands
- ☐ Arrangement of the tissues, organs or glands

## Reflection

| | Yes | No |
|---|---|---|
| Do I clearly understand the functions of the system I will model? | ☐ | ☐ |

Name: _____ Group: _____

# COMPLETING THE PROJECT

## I make suggestions

1. Before creating your model, draw your plan.
2. Stress the key points of your presentation, using the information compiled in the tables on system components and functions.
3. Think of comparisons that could help you explain how your chosen/assigned system functions. Summarize your comparisons below after reading the example provided to get you thinking.

**Example:** ***The nervous system is similar to a computer that manages the information coming in and going out.***

## Reflection

| | Yes | No |
|---|---|---|
| Have I explored several ways of creating my model? | ☐ | ☐ |

After your plan of action has been approved, create your model.

Teacher's approval

Name: _____ Group: _____

# VALIDATING THE PROJECT

## I justify my approach

**1.** Does the model make your system more understandable? Explain your answer.

**2.** What are the strong points and weak points of your model?

**3.** How could you improve the way you handled the design stages for your model?

**4.** What problems did you run into? How did you solve them?

Name: _____ Group: _____

# SUMMARIZING THE OTHER SYSTEMS

While the other teams are presenting their models, use the tables in this section to summarize the information the animation artists need to design their film.

**System:** _____

**Presented by:** _____

| System component | Functions |
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| System's function | Description |
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Name: _____ Group: _____

# SUMMARIZING THE OTHER SYSTEMS *(continued)*

While the other teams are presenting their models, use the tables in this section to summarize the information the animation artists need to design their film.

**System:** _____

**Presented by:** _____

| System component | Functions |
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| System's function | Description |
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Name: _____ Group: _____

# SUMMARIZING THE OTHER SYSTEMS *(continued)*

While the other teams are presenting their models, use the tables in this section to summarize the information the animation artists need to design their film.

**System:** _____

**Presented by:** _____

| System component | Functions |
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| System's function | Description |
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Name: _____ Group: _____

# SUMMARIZING THE OTHER SYSTEMS *(continued)*

While the other teams are presenting their models, use the tables in this section to summarize the information the animation artists need to design their film.

**System:** _____

**Presented by:** _____

| System component | Functions |
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| System's function | Description |
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Name: _____ Group: _____

# SUMMARIZING THE OTHER SYSTEMS *(continued)*

While the other teams are presenting their models, use the tables in this section to summarize the information the animation artists need to design their film.

**System:** _____

**Presented by:** _____

| System component | Functions |
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| System's function | Description |
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Name: _____ Group: _____

# SUMMARIZING THE OTHER SYSTEMS *(continued)*

While the other teams are presenting their models, use the tables in this section to summarize the information the animation artists need to design their film.

**System:** _____

**Presented by:** _____

| System component | Functions |
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| System's function | Description |
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Name: _____ Group: _____

# MY EVALUATION

Use the evaluation grid on the next page for your self-evaluation. Enter A, B, C, D or E in the appropriate space in this table.

| SSC3 Communicates in the languages used in science and technology | | | | |
|---|---|---|---|---|
| **Criteria*** | **Observable indicators** | **Me** | **Teacher** | **Comments** |
| **1** | **Gathering information**<br>Description of system components and how the system functions | | ☐ With help | |
| **2** | **Completing the project**<br>Explanation of the system and the model | | ☐ With help | |
| **3** | **Completing the project**<br>Use of appropriate scientific terminology | | ☐ With help | |

*** Evaluation criteria**

**1** Accurate interpretation of scientific and technological messages

**2** Appropriate production or sharing of scientific and technological messages

**3** Use of appropriate scientific and technological terminology, rules and conventions

Name: _____ Group: _____

# EVALUATION GRID

## SSC 3 Communicates in the languages used in science and technology

| Criteria* | Observable indicators | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1 | **GATHERING INFORMATION**<br>Description of system components and how the system functions | The descriptions of system components and how the system functions are very clear and show a good understanding of the concepts. | The descriptions of system components and how the system functions are clear, but with a few minor errors. | The descriptions of system components and how the system functions are more or less clear or include several errors. | The descriptions of system components and how the system functions contain several major errors. | The work needs to be redone. |
| 2 | **COMPLETING THE PROJECT**<br>Explanation of the system and the model | The explanations are very clear and well organized, and the model provides a good understanding of the system. | The explanations are clear and the model provides a good understanding of the system. | The explanations are more or less clear<br>OR<br>there are several errors in the model. | The explanations are more or less clear<br>AND<br>there are several errors in the model. | The work needs to be redone. |
| 3 | **COMPLETING THE PROJECT**<br>Use of appropriate scientific terminology | All system components are clearly identified on the model. Appropriate scientific terminology is used for all explanations. | Most system components are clearly identified on the model. Appropriate scientific terminology is used for most explanations. | A few system components are clearly identified on the model<br>OR<br>more or less appropriate scientific terminology is used for the explanations. | A few system components are clearly identified on the model<br>AND<br>more or less appropriate scientific terminology is used for the explanations. | The work needs to be redone. |

### * Evaluation criteria

**1** Accurate interpretation of scientific and technological messages

**2** Appropriate production or sharing of scientific and technological messages

**3** Use of appropriate scientific and technological terminology, rules and conventions