

Normal Cell Division Script

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The **CELL MEMBRANE** sets up the cell by placing two long pieces of yarn in a circle on the floor. The **NUCLEAR ENVELOPE** is then formed by placing two smaller pieces of yarn in the shape of a circle inside of the cell membrane.

ACT I. Interphase

Scene I: G0 Phase

NARRATOR: The Cell is in the G0 Phase, the resting state.

[VO] VOICE OVER: CENTRIOLE #1 enters the cell, standing near the cell membrane. DNA MOLECULES #1, # 2, and #3 enter the cell and stand inside the Nuclear Envelope. ENZYME 1 and 2 stand outside of the cell. The enzymes of the cell starts the events of the cell cycle.

Enzyme 2: Go!

Scene II: G1 Phase

Narrator: We are now entering the G1 Phase. During G1 Phase of Growth 1/Gap 1 phase, the cell prepares for S phase by increasing in size.

[VO]: Cell Membrane increases the size of the cell membrane by a small amount.

Narrator: G1 Checkpoint!

Enzyme 1: Stop! There is a problem.

Enzyme 2: The Cell is too small. It needs to be bigger.

Narrator: Cell Membrane then stretches the yarn out to make the cell bigger.

Enzyme 1: The Cell is the right size. The G1 Checkpoint is all clear!

Enzyme 2: Go!

Narrator: G1 phase is complete.

Scene III: S Phase.

Narrator: We are now entering the S Phase. In S phase (synthesis phase), DNA is replicated.

[VO]: CENTRIOLE #2 enters the cell and stands next to Centriole #1. REPLICATED DNA MOLECULES #1, 2 and 3 enter the cell. Each replicated DNA stands next to its original DNA Molecule and links arms forming their centromere.

Narrator: S phase is complete. We are now entering the G2 Phase

Scene IV: The Cell is in the G2 Phase.

Narrator: G2 phase is a period of rapid cell growth and protein synthesis. Many organelles and molecules needed for cell division are being produced.

Enzyme 2: Go!

Narrator: G2 phase is now complete. We are ready to move to the next phase!

Normal Cell Division Script

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ACT II. Mitosis

Scene I: Prophase.

Narrator: The Cell is now in Prophase.

[VO]: Cell Membrane *removes the Nuclear Envelope.* The DNA Molecules formed chromosomes are now known as sister chromatids which are linked together at the centromere (*Chromatids are standing making a triangle-shape*). DNA Molecules *flip nametags to be CHROMATIDS.* Centriole #1 & #2 *each hold one unsharpened pencil with three pieces of yarn attached [representing spindle fibers], and start to move toward opposite ends of the cell.*

Narrator: Prophase is complete.

[VO]: Centrioles extend out their hands to reach the Chromatids. Each of the Chromatids *grab the spindle fiber from the opposite Centriole.*

Scene II: Metaphase.

Narrator: The Cell is in Metaphase.

[VO]: Chromatids *form three rows in the center of the cell. Facing the enzymes, they stand with their shoulder in the direction of the centriole they are attached to. Centrioles extend out their hands to reach the Chromatids. Each of the Chromatids continue holding the spindle fiber from the opposite Centriole. Chromatid #2 takes the fiber, but then drops it.*

Narrator: Spindle Checkpoint!

Enzyme 1: Stop! There is a problem. The Chromosomes are not connected correctly! This needs to be repaired.

[VO]: Chromatid # 2 *picks up the dropped spindle fiber [yarn].*

Narrator: The Spindle Checkpoint is all clear!

Enzyme 2: Go!

Narrator: Metaphase is complete. We are now entering Anaphase.

Scene III: Anaphase.

[VO]: Each Centriole *steps back, pulling their attached Chromatids along, chromatids unlock arms and move towards opposite ends of the cell. The Cell Membrane is pulled back at the poles and starts to pinch in the middle so the cell resembles a peanut.*

Narrator: Anaphase is complete. We are now entering Telophase.

Scene IV: Telophase.

[VO]: Chromatids *release spindle fibers, and the Centrioles condense the spindle fibers and lower arms. The Nuclear Envelope is restored in each daughter cell.*

Narrator: Telophase is complete. We are now entering Cytokinesis.

[VO]: The Cell Membrane *separates to form the membrane of the two daughter cells.*

Enzyme 1: Stop

Narrator: The Cell has successfully divided into two identical Cells, which will now rest in the G0 phase until they receive the signal to divide again.

The End.

Tumor Suppressor Mutation Script

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ACT I. Interphase

Scene I: G0 Phase

NARRATOR: The Cell is in the G0 Phase, the resting state.

[VO] VOICE OVER: CENTRIOLE #1 enters the cell, standing near the cell membrane. MUTATED DNA MOLECULE #1, DNA MOLECULE # 2, and DNA MOLECULE #3 enter the cell and stand inside the Nuclear Envelope. ENZYME 1 and 2 stand outside of the cell. The enzymes of the cell starts the events of the cell cycle.

Enzyme 2: Go!

Scene II: G1 Phase

Narrator: We are now entering the G1 Phase. During G1 Phase of Growth 1/Gap 1 phase, the cell prepares for S phase by increasing in size.

[VO]: Cell Membrane increases the size of the cell membrane by a small amount.

Narrator: G1 Checkpoint!

Enzyme 1: Stop! There is a problem.

Enzyme 2: The Cell is too small. It needs to be bigger.

Narrator: Cell Membrane then stretches the yarn out to make the cell bigger.

Enzyme 1: The Cell is the right size. The G1 Checkpoint is all clear!

Enzyme 2: Go!

Narrator: G1 phase is complete.

Scene III: S Phase.

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[VO]: CENTRIOLE #2 enters the cell and stands next to Centriole #1. REPLICATED DNA MOLECULES #2 and #3 enter the cell. Each replicated DNA stands next to its original DNA Molecule and links arms forming their centromere. The four REPLICATED MUTATED DNA MOLECULES 1 enters the Cell and stands next to original mutated DNA 1 molecule, and link arms forming a long chain of mutated DNA molecules

Narrator: S phase is complete. We are now entering the G2 Phase

Scene IV: The Cell is in the G2 Phase.

Narrator: G2 phase is a period of rapid cell growth and protein synthesis. Many organelles and molecules needed for cell division are being produced.

Enzyme 2: Go!

Narrator: G2 phase is now complete. We are ready to move to the next phase!

Tumor Suppressor Gene Mutation Script

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ACT II. Mitosis

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Narrator: The Cell is now in Prophase.

[VO]: Cell Membrane *removes the* Nuclear Envelope. The DNA Molecules formed chromosomes are now known as sister chromatids which are linked together at the centromere (*Chromatids are standing making a triangle-shape*). DNA Molecules *flip nametags to be* CHROMATIDS. Centriole #1 & #2 *each hold one unsharpened pencil with three pieces of yarn attached* [representing spindle fibers], *and start to move toward opposite ends of the cell.*

Narrator: Prophase is complete.

[VO]: Centrioles extend out their hands to reach the Chromatids. Each of the Chromatids *grab the spindle fiber from the opposite Centriole.*

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Enzyme 1: Stop! There is a problem. The Chromosomes are not connected correctly! This needs to be repaired.

[VO]: Chromatid # 2 *picks up the dropped spindle fiber [yarn].*

Narrator: The Spindle Checkpoint is all clear!

Enzyme 2: Go! Keep moving through the Cycle!

Narrator: I guess everything is okay. The Spindle Checkpoint is all clear!

Enzyme 2: Go!

Narrator: Metaphase is complete. We are now entering Anaphase.

Scene III: Anaphase.

[VO]: Each Centriole *steps back, pulling their attached Chromatids along, chromatids unlock arms and move towards opposite ends of the cell. The Cell Membrane is pulled back at the poles and starts to pinch in the middle so the cell resembles a peanut.*

Narrator: Anaphase is complete. We are now entering Telophase.

Scene IV: Telophase.

[VO]: Chromatids *release spindle fibers, and the Centrioles condense the spindle fibers and lower arms. The Nuclear Envelope is restored in each daughter cell.*

Narrator: Telophase is complete. We are now entering Cytokinesis.

[VO]: The Cell Membrane *separates to form the membrane of the two daughter cells.*

Enzyme 1: Everything looks good.

Narrator: The Cell has successfully divided into two non-identical Cells, due to a Tumor Suppressor Gene which does not function properly. The Cell will now rest in the G0 phase until they receive the signal to divide again.

The End.

Proto-oncogene Mutation Script

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