Understanding Placental and Fetal Circulation: Learner Worksheet

Section 1: The Placenta

Primary Role of the Placenta

The placenta functions as the fetus's _____, providing

- _____
- _____
- _____
- _____
- _____
- _____

Maternal and fetal blood:
□ Mix Directly □ Remain separate □ Mix only during labor

Section 2: Uterine Growth & Vascular Adaptation

Uterine Growth

During pregnancy, the uterus grows from approximately the size of a _____ to a _____.

This growth requires increases in:
□ Muscle Fibers
□ Blood vessels
□ Nerves
□ All of the above

Uterine Blood Flow

Uterine blood flow increases approximately _____-fold during pregnancy.

Vascular Adaptations

Hypertrophy: enlargement in existing cells
Hyperplasia: increase in number of cells

Spiral Arteries

In a normal pregnancy, spiral arteries change from:
Narrow / High resistance → _____ / _____

Clinical Impact

Failure of spiral artery remodeling increases the risk for:

1.
2.

What happens to placental perfusion when remodeling fails?

_____

_____

Section 3: The Umbilical Cord & Fetal Circulation

Umbilical Cord Anatomy

The umbilical cord contains:

- _____ arteries
- _____ vein

Which vessel carries oxygenated blood to the fetus? _____

Fetal Circulation

Before birth, fetal lungs:

□ Perform gas exchange
□ Are fluid filled and bypassed
□ Inflate during contractions

Two fetal shunts that bypass the lungs are:

- _____
- _____

Section 4: Fetal CNS Development

Neurologic Control

Early fetal heart rate is controlled primarily by:

□ The autonomic nervous system
□ An intrinsic pacemaker
□ Maternal hormones

Neurologic control becomes more significant during the _____ trimester.

Heart Rate Variability

As gestational age increases, fetal heart rate variability generally:

□ Decreases
□ Increases
□ Remains unchanged

Section 5: Labor & Utero-Placental Blood Flow

Effect of Contractions

During a uterine contraction, placental blood flow:

□ Increases
□ Temporarily decreases
□ Stops completely

Which vessels collapse first and why?

_____

Recovery Phase

The most important part of a contraction for fetal oxygenation is the:

□ Peak
□ Contraction itself
□ Relaxation phase

Why is this phase critical for the fetus?

_____
_____
_____

Critical Thinking

Why might a fetus with limited placental reserve show late decelerations during labor?

_____
_____
_____
_____
_____
_____
_____

Reflection

In your own words, describe how the placenta, uterus, and fetus work together to support pregnancy and labor.

_____
_____
_____
_____
_____
_____
_____