**APPENDIX 1**

**ANGKET MAHASISWA**

**Developing Physics Bilingual Learning Media "VOCARELI"**

**on Fluid Dynamics for Senior High School Students**

Setelah Anda mengoperasikan media, silahkan lengkapi pernyataan berikut dengan memberi tanda centang (✓) pada :

| No. | Pernyataan | Skala | | | | |
|---|---|---|---|---|---|---|
| | | SS | S | R | TS | STS |
| 1 | Saya tidak mengalami kesulitan dalam membuka program | | | | | |
| 2 | Saya tidak mengalami kesulitan dalam mengoperasikan program | | | | | |
| 3 | Menurut saya tampilan program menarik | | | | | |
| 4 | Saya dapat memahami materi pembelajaran dengan mudah | | | | | |
| 5 | Animasi pada media membantu saya dalam memahami materi Fluida Dinamis | | | | | |
| 6 | Video Fenomena yang ditampilkan menambah pemahaman saya terhadap materi | | | | | |
| 7 | Saya dapat mempelajari media secara mandiri | | | | | |
| 8 | Mempermudah saya dalam menambah *vocabulary* | | | | | |
| 9 | Teks bilingual melatih saya dalam mengembangkan *reading skill* | | | | | |
| 10 | Media dapat mengembangkan *listening skill* saya | | | | | |
| 11 | Media membuat saya bingung memahami materi Fluida Dinamis | | | | | |

Keterangan:

SS : Sangat Setuju
S : Setuju
R : Ragu
TS : Tidak Setuju

**APPENDIX 2**

**ANGKET SISWA**

**Developing Physics Bilingual Learning Media "VOCARELI"**

**on Fluid Dynamics for Senior High School Students**

Setelah Anda mengoperasikan media, silahkan lengkapi pernyataan berikut dengan memberi tanda centang (✓) pada :

| No. | Pernyataan | Skala | | | | |
|---|---|---|---|---|---|---|
| | | SS | S | R | TS | STS |
| 1 | Saya tidak mengalami kesulitan dalam membuka program | | | | | |
| 2 | Saya tidak mengalami kesulitan dalam mengoperasikan program | | | | | |
| 3 | Menurut saya tampilan program menarik | | | | | |
| 4 | Saya dapat memahami materi pembelajaran dengan mudah | | | | | |
| 5 | Animasi pada media membantu saya dalam memahami materi Fluida Dinamis | | | | | |
| 6 | Video Fenomena yang ditampilkan menambah pemahaman saya terhadap materi | | | | | |
| 7 | Saya dapat mempelajari media secara mandiri | | | | | |
| 8 | Mempermudah saya dalam menambah *vocabulary* | | | | | |
| 9 | Teks bilingual melatih saya dalam mengembangkan *reading skill* | | | | | |
| 10 | Media dapat mengembangkan *listening skill* saya | | | | | |
| 11 | Media membuat saya bingung memahami materi Fluida Dinamis | | | | | |

Keterangan:

SS : Sangat Setuju
S : Setuju
R : Ragu
TS : Tidak Setuju
STS : Sangat Tidak Setuju

## APPENDIX 3

## Answer of the Exercises

### I. Flow Rate and Debit

If 10 litres of water poured into a container through a hose with a broad cross-section of 5 $cm^2$ takes 2 second, determine the flow rate of the water in the hose!

Given : V = 10 litres = 1 x $10^{-2}$ $m^3$

A = 5 $cm^2$ = 5 x $10^{-4}$ $m^2$

t = 2 s

Problem : *v* = .... ?

Solution :

$$\frac{V}{t} = A.v$$

$$\frac{1 \text{ x } 10^{-2}}{2} = 5 \text{ x } 10^{-4} . v$$

$$v = \frac{1 \text{ x } 10^{-2}}{1 \text{ x } 10^{-3}}$$

$$v = 10\, m/s$$

**II. Continuity Equation**

Water flows through a horizontal pipe which has cross-sectional area at each end are 20 $cm^2$ and 9 $cm^2$. If the velocity of a fluid on a small cross-section is 20 m/s, what is the velocity of fluid at a large cross-section?

Given : $A_1 = 20\ cm^2 = 2 \times 10^{-3}\ m^2$

$A_2 = 9\ cm^2 = 9 \times 10^{-4}\ m^2$

$v_2 = 20$ m/s

Problem : $v_1$ = .... ?

Solution :

$$A_1 . v_1 = A_2 . v_2$$

$$2 \times 10^{-3} . v_1 = 9 \times 10^{-4} . 20$$

$$v_1 = \frac{20 \times 9 \times 10^{-4}}{2 \times 10^{-3}}$$

$$v_1 = 9\ m/s$$

**III. Bernoulli's Principle**

A channel has a large pipe with 80,000 Pa pressure at a flow rate of 1 m/s. It ends at a small pipe surface is as high as 2 m above, with a flow rate of 4 m/s. Calculate the pressure at the surface of the small pipe when the water density is 1000 kg/m$^3$. (g = 10 m/s$^2$)

Given : $P_1$ = 80.000 Pa

$h_2$ = 2 m

$v_1$ = 1 m/s

$v_2$ = 4 m/s

Problem : $P_2$ = .... ?

Solution :

$$P_1 + \rho\, g\, h_1 + \frac{1}{2}\rho\, {v_1}^2 = P_2 + \rho\, g\, h_2 + \frac{1}{2}\rho\, {v_2}^2$$

$$80.000 + \frac{1}{2}1.000\ 1^2 = P_2 + 1.000\,.10.2 + \frac{1}{2}1000$$

$$80.500 = P_2 + 20.000 + 8.000$$

$$P_2 = 80.500 - 28.000$$

$$P_2 = 52.500\ Pa$$

**IV. Torricelli's Principle**

A tank containing water is placed in the ground. High water level is 1.25 m from the ground. At a height of 0.8 m from the ground, there is a leak hole, so that the water flows through the hole. Calculate (a) the speed of the water coming out of the hole and (b) discharge of water per second if the aperture area of 1 $mm^2$.

Given : $h_1 = 1{,}25$ m

$h_2 = 0{,}8$ m

$A_2 = 1\ mm^2$

Problem : $v_2$ = .... ?

Q = .... ?

Solution :

a. $v_2 = \sqrt{2 \,.\, g \,.\, (h_1 - h_2)}$

$= \sqrt{2 \,.\, 10 \,.\, (1{,}25 - 0{,}8)} = \sqrt{9}$

$v_2 = 3\ m/s$

b. $Q = A_2 .\ v_2 = 1 \,.\, 3000$

$Q = 3000\ \ mm^3/s$

$Q = 3\ x\ 10^{-6}\ \ m^3/s$

**V. Venturimeter**

A pipe cross-sectional area ($A_1$) venturimeter two times larger than other cross-sectional area ($A_2$). When g = 10 m/s$^2$ and there are differences in water height of 135 cm, determine the speed of the water that enters the venturi pipe.

Given : $A_1 = 2\ A_2$

$g = 10\ m/s^2$

Problem : $v_1$ = .... ?

Solution : $h = 1{,}35\ m$

$$v_1 = \sqrt{\frac{2 . g . h}{\left(\frac{A_1}{A_2}\right)^2 - 1}}$$

$$v_1 = \sqrt{\frac{2 . 10 . 1{,}35}{\left(\frac{2 . A_2}{A_2}\right)^2 - 1}}$$

$$v_1 = \sqrt{\frac{27}{2^2 - 1}} = \sqrt{\frac{27}{3}}$$

$$v_1 = 3\ m/s$$

**VI. Lift Force on Airplane**

Air passing through the top and bottom of each wing aircraft with a speed of 150 m/s and 140 m/s. Determine the magnitude of the lift force on the wing, if each wing has an area of 20 $m^2$ and air density of 1.2 $kg/m^3$.

Given : A = 20 $m^2$
ρ = 1,2 $kg/m^3$
$v_2$ = 150 m/s
$v_1$ = 140 m/s

Problem : ΔF = .... ?

Solution :

$$\Delta F = \frac{1}{2}\rho \left(v_2{}^2 - v_1{}^2\right) A$$

$$\Delta F = \frac{1}{2}\ 1.2\ \left(150^2 - 140^2\right) 20$$

$$\Delta F = 12\ (2.900)$$

$$\Delta F = 34.800\ Pa$$

**APPENDIX 4**

**Answer of Extra Test**

1. A water tank filled with water from a tap such as in the picture. If the tap's diameter is 2 cm and the fluid flow rate inside the tap is 7 m/s, then the debit is ....

   Given : $d = 2 \times 10^{-2}$ m

   Problem : $Q = ?$ $v = 7$ m/s

   Solution :

$$Q = A.v$$

$$Q = \frac{1}{4}\pi d^2 . v$$

$$= \frac{1}{4}\, 3.14\, (2\, x\, 10^{-2})^2 .7$$

$$Q = 2{,}2\, x\ 10^{-3}\, m^3/s \qquad (\boldsymbol{C})$$

2. The total cross-sectional area of capillaries in the blood circulation is 0,25 $m^2$. If the blood flow through the system at a flow rate of 100 $cm^3/s$, then the velocity of blood in the capillaries is .... mm/s

Given :

$A = 0{,}25\ m^2$

Problem : $v$ ... ?

Solution :

$Q = 100\ cm^3/s$

$Q = A.v$

$100.000 = 0{,}25 \,.\, 1.000.000 \,.\, v$

$100.000 = 250.000 \,.\, v$

$$v = \frac{100.000}{250.000}$$

$$v = \frac{10}{25}$$

$v = 0{,}4\ mm/s$ $(\boldsymbol{C})$

$v = 4 \times 10^{-4}\ m/s$

3. A large pipe has a cross-sectional area 6 $cm^2$. Pipe ends have a faucet with cross-sectional area 2 $cm^2$. Velocity of liquid at a large pipe is 0,2 m/s. Within 10 minutes, the volume of liquid that will come out of the tap is....

Given : $A_1 = 6 \times 10^{-4}\ m^2$

$A_2 = 2 \times 10^{-4}\ m^2$

$v_1 = 0{,}2$ m/s

Problem : V = .... ?

Solution : t = 10 mins = 600 s

a. $A_1 . v_1 = A_2 . v_2$

$6\ x\ 10^{-4} .\ 0{,}2 = 2\ x\ 10^{-4} . v_2$

$v_2 = 0{,}6\ m/s$

b. $\frac{V_2}{t} = A_2 . v_2$

$\frac{V_2}{600} = 2\ x\ 10^{-4} . 0{,}6$

$V_2 = 72\ x\ 10^{-3}\ m^3$ $(\boldsymbol{E})$

4. The water flows through a venturi pipe. If the cross-sectional area $A_1$ = 10 $cm^2$ and $A_2$ = 8 $cm^2$, then the speed of the incoming water pipe venturimeter is .... ( h = 45 cm)

Given :

$A_1 = 10 \times 10^{-4}\ m^2$

$A_2 = 8 \times 10^{-4}\ m^2$

Problem : $v_1$ = ....

Solution :

$$v_1 = \sqrt{\frac{2.g.h}{\left(\frac{A_1}{A_2}\right)^2 - 1}}$$

$$v_1 = \sqrt{\frac{2 \,.\, 10 \,.\, 0{,}45}{\left(\frac{10}{8}\right)^2 - 1}}$$

$$v_1 = \sqrt{\frac{9}{1{,}56 - 1}} = \sqrt{\frac{9}{0{,}56}}$$

$$v_1 = 4\ m/s \qquad (\boldsymbol{C})$$

5. cylinder pipe is placed horizontally. The flow velocity at A = 3 m/s and at B = 10 m/s. The pressure in A = 4 x $10^5$ Pa, then the pressure in B is .... ($h_b$ = 5m ,ρ = 1000 kg/$m^3$, g = 10 m/s)

   Given :

   $v_A$ = 3 m/s

   Problem : $P_B$ = .... ?

   $v_B$ = 10 m/s

   Solution : $P_A = 4 \times 10^5$

$$P_A + \rho\, g\, h_A + \frac{1}{2}\rho\, {v_A}^2 = P_B + \rho\, g\, h_B + \frac{1}{2}\rho\, {v_B}^2$$

$$4\, x\, 10^5 + \frac{1}{2}\, 1.000\, 3^2 = P_2 + 1.000\, .\, 10.\, 5 + \frac{1}{2} 1000$$

$$404.500 = P_2 + 50.000 + 50.000$$

$$P_2 = 404.500 - 100.000$$

$$P_2 = 304.500\, Pa \qquad (\boldsymbol{D})$$

6. There is a large tub of water. Near the base like there is a hole that can be closed and opened. The rate of water coming out through the hole when the tap is opened is ....

   Solution :

   Slower if the hole is wide **(C)**

7. Water filled into a vessel to a height h. If a hole is made at a depth h/2 below the surface of the water, the water will spray out with a distance of 120 cm. If a hole is made at a depth h/3, the spray of water will land on the ground at a distance .... cm

Given : $x = 120$ m/s

$\Delta h = h/2$

$\Delta h' = h/3$

Problem : $x' = ....$ ?

Solution :

c. $x = 2\sqrt{h_2\,(h_1 - h_2)}$

$120 = 2\sqrt{\frac{h}{2}\frac{h}{2}} = 2\,.\,h/2$

$h = 120\ m$

d. $x' = 2\sqrt{h_2\,(h_1 - h_2)}$

$x' = 2\sqrt{\frac{2h}{3}\frac{h}{3}} = 2\,.\frac{h}{3}\sqrt{2}$

$x' = 2\,.\frac{120}{3}\sqrt{2}$

$x' = 80\sqrt{2}\ cm \quad (\boldsymbol{D})$

$x' = 8\sqrt{2}\ x\ 10^{-1}\ m$

8. There is a large tub of water. Near the base like there is a hole that can be closed and opened. The rate of water coming out through the hole when the tap is opened is ....

Solution :

vA > vB , PB > PA **(D)**

9. A pitot tube is used to measure the speed of airflow. U pipe connected to the arm tube and filled with a liquid that has a density of 800 kg/m$^3$. If the density of air is 1 kg/m$^3$, and a change in height of the mercury as high as 0.25 m, the rate of the air outside is .... (g = 10 m/s$^2$)

Given : $\rho_l = 800$ kg/m$^3$

$\rho_a = 1$ kg/m$^3$

$\Delta h = 0{,}25$ m

Problem : $v$ = .... ?

Solution :

$$v = \sqrt{\frac{2\,.\,(p_1 - p_2)}{\rho_a}}$$

$$v = \sqrt{\frac{2\,.\,(\rho_l . g . h)}{\rho_a}} = \sqrt{\frac{2\,.(800.10.0{,}25)}{1}}$$

$$= \sqrt{4000}$$

$$v = 20\sqrt{10}\, m/s \quad (\boldsymbol{B})$$

10. Consider the following tools:

1. Lift force on aircraft
2. Spray insect repellent
3. Ships do not sink in water
4. The dam wall is getting thicker when getting deeper

Instruments relating to the application of Bernoulli's law is ....

Solution : 1 and 2 **(A)**

## APPENDIX 5

## Action Script Used in Media

Action script used in "VOCARELI" Bilingual Learning Media on Fluid Dynamics Topics will be described below :

### A. Action script on main menus

1. Action script Home Menu

```
on (release) {
        if (_root.link<>1) {
                _parent["b"+_root.link].play();
                _root.link1=_root.link;
                _root.link = 1;
                _parent._parent.play();  }}
```

2. Action script Lesson Menu

```
on (release) {
        if (_root.link<>2) {
                _parent["b"+_root.link].play();
                _root.link1=_root.link;
                _root.link = 2;
                _parent._parent.play(); }}
```

3. Action script Extra Menu

```
on (release) {
        if (_root.link<>3) {
                _parent["b"+_root.link].play();
                _root.link1=_root.link;
                _root.link = 3;
                _parent._parent.play(); }}
```

4. Action script Help Menu

```
if (_root.link<>4) {
                    _parent["b"+_root.link].play();
                    _root.link1=_root.link;
                    _root.link = 4;
                    _parent._parent.play(); }}
```

5. Action script About Menu

```
on (release) {
        if (_root.link<>5) {
                    _parent["b"+_root.link].play();
                    _root.link1=_root.link;
                    _root.link = 5;
                    _parent._parent.play(); }}
```

**B. Action script on Lesson and Topic**

1. Action script link Lesson, button


```
on (release) {
        _root.numPopup = 1;
        _root.mcPopup.f_popup(); }
```

2. Action script link Topics :

- Flow Line

```
on (release) {
            _parent.gotoAndStop("test1");}
```

- Flow Rate and Debit

```
on (release) {
            _parent.gotoAndStop("test2");}
```

- Equation of Continuity

  on (release) {

  _parent.gotoAndStop("test3");}

- Bernoulli's Principle

  on (release) {

  _parent.gotoAndStop("test4");}

- Torricelli's Principle

  on (release) {

  _parent.gotoAndStop("test5");}

- Venturimeter

  on (release) {

  _parent.gotoAndStop("test6");}

- Pitot Tube

  on (release) {

  _parent.gotoAndStop("test7");}

- Lift Force on a Plane

  on (release) {

  _parent.gotoAndStop("test8");}

- Mosquito Sprayer

  on (release) {

  _parent.gotoAndStop("test9");}

3. Action script listening, button :

- Flow Line

  on (press) {

  stopAllSounds()

```
        ass6.gotoAndPlay("play");
        nextFrame(); }
```

- Flow Rate and Debit

```
on (press) {
        stopAllSounds()
        ass.gotoAndPlay("play");
        nextFrame(); }
```

- Equation of Continuity

```
on (press) {
        stopAllSounds()
        ass1.gotoAndPlay("play");
        nextFrame(); }
```

- Bernoulli's Principle

```
on (press) {
        stopAllSounds()
        ass2.gotoAndPlay("play");
        nextFrame(); }
```

- Torricelli's Principle

```
on (press) {
        stopAllSounds()
        ass9.gotoAndPlay("play");
        nextFrame(); }
```

- Venturimeter

```
on (press) {
        stopAllSounds()
        ass8.gotoAndPlay("play");
        nextFrame(); }
```

- Pitot Tube

```
on (press) {
        stopAllSounds()
        ass10.gotoAndPlay("play");
        nextFrame(); }
```

- Lift Force on a Plane

```
on (press) {
        stopAllSounds()
        ass11.gotoAndPlay("play");
        nextFrame(); }
```

- Mosquito Sprayer

```
on (press) {
        stopAllSounds()
        ass7.gotoAndPlay("play");
        nextFrame(); }
```

4. Action script exercises answer, button : 

- Fluid Flow Rate

```
on (release) {
        if (ans1.toLowerCase() == "10") {
                ket1 = "Your answer correct";
        } else {
                ket1 = "Wrong answer !";
        }}
```

- Continuity Equation

```
on (release) {
        if (ans2.toLowerCase() == "9") {
```

```
                ket2 = "Your answer correct";
        } else {
                ket2 = "Wrong answer !";
        }}
```

- Bernoulli's Principle

```
on (release) {
        if (ans5.toLowerCase() == "52500") {
                ket5 = "Your answer correct";
        }
                else {
                ket5 = "Wrong answer !";
        }}
```

- Torricelli's Principle

- 
```
on (release) {
        if (ans4.toLowerCase() == "3") {
                ket4 = "Your answer correct";
        }
                else {
                ket4 = "Wrong answer !";
        }}
```

- 
```
on (release) {
        if (ans44.toLowerCase() == "3000") {
                ket44 = "Your answer correct";
        }       else {
                ket44 = "Wrong answer !";
        }}
```

- Lift Force on a Plane

```
on (release) {
        if (ans3.toLowerCase() == "34800") {
                ket3 = "Your answer correct";
        }
                else {
                ket3 = "Wrong answer !";
        }}
```

- Venturimeter

```
on (release) {
        if (ans5.toLowerCase() == "3") {
                ket5 = "Your answer correct";
        }       else {
                ket5 = "Wrong answer !";
        }}
```

**C. Action script on Extra Test**

1. Action script link to Extra Test :

```
on (release) {
        fscommand("exec","flasheuid01.exe");        }
```

2. Action script on Extra Test

- Correct Choice action script

```
on (press) {
        play();
        _parent.satu._visible=0
                //_parent.ans1.selected      =false
                _parent.benar=_parent.benar+10
```

```
}
```

- Wrong Answer Choice

```
on (press) {
        play();
        _parent.satu._visible=0
            //_parent.ans1.selected      =false
            _parent.benar=_parent.benar+0
        }
```

- Extra Test Finish Button

```
on (release) {
        gotoAndStop("final");

        finale.text=namaKelompok+","+" "+"nilai anda
adalah"+" "+benar }
```

**D. Action script link Help Images, button** : 

1. Help no. 1

```
on (release) {
        gotoAndPlay(3);
}
```

2. Help no. 2

```
on (release) {
        gotoAndPlay(4); }
```

3. Help no. 3

```
on (release) {
        gotoAndPlay(5); }
```

4. Help no. 4

```
on (release) {
        gotoAndPlay(6); }
```

## E. Action script on Simple Dictionary

1. Action script button Translate :

```
on (press) {
        if (ing == "contain") {
                ind = "terdiri dari";           }
        if (ing == "flow") {
                ind = "mengalir/aliran";    }
        if (ing == "line") {
                ind = "baris";      }
        if (ing == "dynamics") {
                ind = "dinamika";}
        if (ing == "continuous") {
                ind = "berkelanjutan";      }
        if (ing == "fluid") {
                ind = "cairan";     }
        if (ing == "subdiscipline") {
                ind = "bagian";     }
        if (ing == "natural") {
                ind = "alami";      }
        if (ing == "experience") {
                ind = "mengalami";          }
        if (ing == "incompressible") {
                ind = "tak termampatkan"; }
        if (ing == "compressible") {
```

```
            ind = "termampatkan";       }
if (ing == "steady") {
            ind = "tunak/stabil";       }
if (ing == "viscous") {
            ind = "kental";     }
if (ing == "inviscid") {
            ind = "tak kental";         }
if (ing == "path") {
            ind = "lintasan";   }
if (ing == "consist") {
            ind = "terdiri";    }
if (ing == "straight") {
            ind = "lurus";      }
if (ing == "curved") {
            ind = "lengkung";}
if (ing == "velocity") {
            ind = "kecepatan";          }
if (ing == "amount") {
            ind = "jumlah";     }
if (ing == "passing") {
            ind = "melewati";}
if (ing == "pass") {
            ind = "melewati";}
if (ing == "section") {
            ind = "bagian";     }
if (ing == "flow rate") {
            ind = "kecepatan";          }
```

```
if (ing == "distances") {
        ind = "jarak";      }
if (ing == "states") {
        ind = "menyatakan";         }
if (ing == "element") {
        ind = "elemen";   }
if (ing == "shifted") {
        ind = "bergeser";  }
if (ing == "interval") {
        ind = "selang/beda";        }
if (ing == "various") {
        ind = "berbagai";  }
if (ing == "enactment") {
        ind = "hukum";    }
if (ing == "equation") {
        ind = "persamaan";          }
if (ing == "narrow") {
        ind = "sempit";    }
if (ing == "connected") {
        ind = "berhubungan";        }
if (ing == "vessel") {
        ind = "bejana";    }
if (ing == "pressure") {
        ind = "tekanan";   }
if (ing == "phenomenas") {
        ind = "fenomena";           }
if (ing == "phenomena") {
```

```
            ind = "fenomena";           }
if (ing == "indicating") {
            ind = "menunjukkan";        }
if (ing == "derived") {
            ind = "diturunkan";         }
if (ing == "mechanical") {
            ind = "mekanik"; }
if (ing == "decline") {
            ind = "penurunan";          }
if (ing == "considered") {
            ind = "dianggap";}
if (ing == "measure") {
            ind = "mengukur";           }
if (ing == "") {
            ind = "";}
if (ing == "combustion") {
            ind = "pembakaran";         }
if (ing == "mixture") {
            ind = "campuran";           }
if (ing == "form") {
            ind = "berupa";    }
if (ing == "flammable") {
            ind = "mudah terbakar";    }
if (ing == "are") {
            ind = "adalah";    }
if (ing == "deals") {
            ind = "berkaitan";}
```

```
if (ing == "debit") {
        ind = "debit";      }
if (ing == "equal") {
        ind = "sama";       }
if (ing == "existence") {
        ind = "keberadaan";         }
if (ing == "fluid") {
        ind = "cairan";     }
if (ing == "friction") {
        ind = "gesekan";  }
if (ing == "gases") {
        ind = "gas";        }
if (ing == "has") {
        ind = "memiliki"; }
if (ing == "have") {
        ind = "memiliki"; }
if (ing == "laminar") {
        ind = "laminar/berlapis";   }
if (ing == "marked") {
        ind = "ditandai";  }
if (ing == "mechanics") {
        ind = "mekanika";           }
if (ing == "of") {
        ind = "dari";       }
if (ing == "pipe") {
        ind = "pipa";       }
if (ing == "rotary") {
```

```
            ind = "putaran";   }
if (ing == "scale") {
            ind = "skala";     }
if (ing == "turbulent") {
            ind = "bergolak"; }
if (ing == "viscosity") {
            ind = "kelekatan";          }
if (ing == "volume") {
            ind = "volume";    }
if (ing == "called") {
            ind = "disebut";   }
if (ing == "edge") {
            ind = "tepi";      }
if (ing == "imaginary") {
            ind = "khayalan"; }
if (ing == "tube") {
            ind = "tabung";    }
if (ing == "travelled") {
            ind = "dilalui";   }
if (ing == "certain") {
            ind = "tertentu";  }
if (ing == "particle") {
            ind = "partikel";  }
if (ing == "move") {
            ind = "berpindah";          }
if (ing == "sufficiently") {
            ind = "cukup";     }
```

```
if (ing == "boundary") {
        ind = "batas";      }
if (ing == "abrupt") {
        ind = "mendadak";           }

if (ing == "irregular") {
        ind = "tidak teratur";          }
if (ing == "chaotic") {
        ind = "kacau";      }
if (ing == "pattern") {
        ind = "pola";       }
if (ing == "important") {
        ind = "penting";    }
if (ing == "leaking") {
        ind = "kebocoran";          }
if (ing == "leaves") {
        ind = "meninggalkan"; }
if (ing == "relationship") {
        ind = "hubungan";           }
if (ing == "quantitative") {
        ind = "kuantitatif";            }
if (ing == "conclude") {
        ind = "menyimpulkan";       }
if (ing == "principle") {
        ind = "prinsip";    }
if (ing == "implemented") {
        ind = "diterapkan/dirumuskan";      }
```

```
if (ing == "cross section") {
        ind = "luas";       }
if (ing == "cross-section") {
        ind = "luas";       }
if (ing == "determine") {
        ind = "menentukan";         }
if (ing == "surface") {
        ind = "permukaan";          }
if (ing == "driven") {
        ind = "ditekan";    }
if (ing == "uniform") {
        ind = "beraturan";          }
if (ing == "acceleration") {
        ind = "percepatan";         }
if (ing == "refining") {
        ind = "pemurnian/pengilangan";      }
if (ing == "gauges") {
        ind = "pengukur";           }
if (ing == "altitude") {
        ind = "ketinggian";         }
if (ing == "molecules") {
        ind = "molekul";
}if (ing == "front") {
        ind = "depan";
}if (ing == "rear") {
        ind = "belakang"; }
if (ing == "wing") {
```

```
            ind = "sayap";      }
        if (ing == "influencing") {
            ind = "mempengaruhi";      }
        if (ing == "piston") {
            ind = "pemicu";    }
        if (ing == "atmosphere") {
            ind = "atmosfer"; }
        if (ing == "motion") {
            ind = "gerakan";   }
        }
```

2. Action script button Pronounciation, button : 

```
on (press) {
        if (ing=="amount") {
            amount.gotoAndPlay("play");
        }
        if(ing=="combustion"){
            combustion.gotoAndPlay("play");
        }
                    if (ing=="compressible") {

        compressible.gotoAndPlay("play");
        }

    if (ing=="connected") {

        connected.gotoAndPlay("play");
```

```
        }
if (ing=="considered") {
        considered.gotoAndPlay("play");
        }

if (ing=="consist") {
                                consist.gotoAndPlay("play");
        }
if (ing=="continuous") {

        continuous.gotoAndPlay("play");
        }
if (ing=="curved") {
                                curved.gotoAndPlay("play");
        }
if (ing=="decline") {
                                dicline.gotoAndPlay("play");
        }
if (ing=="derrived") {
                                derrived.gotoAndPlay("play");
        }
if (ing=="distances") {

        distances.gotoAndPlay("play");
        }
if (ing=="dynamics") {
```

```
        dynamics.gotoAndPlay("play");
        }
if (ing=="element") {
                                element.gotoAndPlay("play");
        }
if (ing=="enactment") {

        enactment.gotoAndPlay("play");
        }
if (ing=="equation") {
                                equation.gotoAndPlay("play");
        }
if (ing=="experience") {

        experience.gotoAndPlay("play");
        }
if (ing=="flammable") {

        flammable.gotoAndPlay("play");
        }
if (ing=="flow rate") {
                                flowrate.gotoAndPlay("play");
        }
if (ing=="flow") {
                                flow.gotoAndPlay("play");
        }
```

```
if (ing=="form") {
                                        form.gotoAndPlay("play");
        }
if (ing=="incompressible") {

        incompressible.gotoAndPlay("play");
        }
if (ing=="indicate") {
                                        indicate.gotoAndPlay("play");
        }
if (ing=="interval") {
                                        interval.gotoAndPlay("play");
        }
if (ing=="inviscid") {
                                        inviscid.gotoAndPlay("play");
        }
if (ing=="line") {
                                        line.gotoAndPlay("play");
        }
if (ing=="measured") {

        measured.gotoAndPlay("play");
        }
if (ing=="mechanical") {

        mechanical.gotoAndPlay("play");
        }
```

```
if (ing=="mixture") {
                                        mixture.gotoAndPlay("play");
        }
if (ing=="narrow") {
                                        narrow.gotoAndPlay("play");
        }
if (ing=="natural") {
                                        natural.gotoAndPlay("play");
        }
if (ing=="pass") {
                                        pass.gotoAndPlay("play");
        }
if (ing=="passing") {
                                        passing.gotoAndPlay("play");
        }
if (ing=="path") {
                                        path.gotoAndPlay("play");
        }
if (ing=="phenomenon") {

        phenomenon.gotoAndPlay("play");
        }
if (ing=="phenomenons") {

        phenomenons.gotoAndPlay("play");
        }
if (ing=="pressure") {
```

```
                                        pressure.gotoAndPlay("play");
            }
if (ing=="section") {
                                        section.gotoAndPlay("play");
            }
if (ing=="shifted") {
                                        shifted.gotoAndPlay("play");
            }
if (ing=="states") {
                                        states.gotoAndPlay("play");
            }
if (ing=="steady") {
                                        steady.gotoAndPlay("play");
            }
if (ing=="straight") {
                                        straight.gotoAndPlay("play");
            }
if (ing=="subdiscipline") {

            subdiscipline.gotoAndPlay("play");
            }
if (ing=="various") {
                                        various.gotoAndPlay("play");
            }
if (ing=="velocity") {
                                        velocity.gotoAndPlay("play");
            }
```

```
if (ing=="vessel") {
                                        vessel.gotoAndPlay("play");
        }
if (ing=="viscous") {
                                        viscous.gotoAndPlay("play");
        }
if (ing=="phenomenon") {

        phenomenon.gotoAndPlay("play");
        }
if (ing=="volume") {
                                        volumee.gotoAndPlay("play");
        }
if (ing=="viscosity") {
                                        viscosity.gotoAndPlay("play");
        }
if (ing=="turbulent") {

        turbulent.gotoAndPlay("play");
        }
if (ing=="scale") {
                                        scale.gotoAndPlay("play");
        }
if (ing=="rotary") {
                                        rotary.gotoAndPlay("play");
        }
if (ing=="pipe") {
```

```
                                        pipe.gotoAndPlay("play");
        }
if (ing=="of") {
                                        of.gotoAndPlay("play");
        }
if (ing=="mechanics") {

        mechanics.gotoAndPlay("play");
        }
if (ing=="marked") {
                                        marked.gotoAndPlay("play");
        }
if (ing=="laminar") {
                                        laminar.gotoAndPlay("play");
        }
if (ing=="is") {
                                        is.gotoAndPlay("play");
        }
if (ing=="have") {
                                        have.gotoAndPlay("play");
        }
if (ing=="has") {
                                        has.gotoAndPlay("play");
        }
if (ing=="gases") {
                                        gases.gotoAndPlay("play");
        }
```

```
if (ing=="friction") {
                                        friction.gotoAndPlay("play");
        }
if (ing=="fluid") {
                                        fluid.gotoAndPlay("play");
        }
if (ing=="existence") {

        existence.gotoAndPlay("play");
        }
if (ing=="equal") {
                                        equal.gotoAndPlay("play");
        }
if (ing=="debit") {
                                        debit.gotoAndPlay("play");
        }
if (ing=="deals") {
                                        deals.gotoAndPlay("play");
        }
if (ing=="are") {
                                        are.gotoAndPlay("play");
        }
if (ing=="consist") {
                                        consist.gotoAndPlay("play");
        }
if (ing=="central") {
                                        central.gotoAndPlay("play");
```

```
        }
if (ing=="bright") {
                                        bright.gotoAndPlay("play");
        }
if (ing=="band") {
                                        band.gotoAndPlay("play");
        }
if (ing=="may") {
                                        may.gotoAndPlay("play");
        }
if (ing=="broader") {
                                        broader.gotoAndPlay("play");
        }
if (ing=="width") {
                                        width1.gotoAndPlay("play");
        }
if (ing=="bordered") {
                                        bordered.gotoAndPlay("play");
        }
if (ing=="alternating") {

        alternating.gotoAndPlay("play");
        }
if (ing=="with") {
                                        with1.gotoAndPlay("play");
        }
if (ing=="rapidly") {
```

```
                                        rapidly.gotoAndPlay("play");
        }
if (ing=="decreasing") {

        decreasing.gotoAndPlay("play");
        }
if (ing=="decrease") {
                                        decrease.gotoAndPlay("play");
        }
if (ing=="increasing") {

        increasing.gotoAndPlay("play");
        }
if (ing=="increase") {
                                        increase.gotoAndPlay("play");
        }
if (ing=="intensity") {
                                        intensity.gotoAndPlay("play");
        }
if (ing=="view") {
                                        view.gotoAndPlay("play");
        }
if (ing=="setup") {
                                        setup.gotoAndPlay("play");
        }
if (ing=="long") {
                                        long.gotoAndPlay("play");
```

```
        }
if (ing=="slide") {
                                        slide.gotoAndPlay("play");
        }
if (ing=="perpendicular") {

        perpendicular.gotoAndPlay("play");
        }
if (ing=="plane") {
                                        plane.gotoAndPlay("play");
        }
if (ing=="incident") {
                                        incident.gotoAndPlay("play");
        }
if (ing=="left") {
                                        left.gotoAndPlay("play");
        }
if (ing=="element") {
                                        element.gotoAndPlay("play");
        }
if (ing=="area") {
                                        area.gotoAndPlay("play");
        }
if (ing=="opening") {
                                        opening.gotoAndPlay("play");
        }
if (ing=="secondary") {
```

```
        secondary.gotoAndPlay("play");
        }
if (ing=="narrow") {
                                        narrow.gotoAndPlay("play");
                                                }
if (ing=="distance") {

        distances.gotoAndPlay("play");
                                                }
if (ing=="motion") {
                                        motion.gotoAndPlay("play");
                                                }
if (ing=="move") {
                                        move.gotoAndPlay("play");
                                                }
if (ing=="particle") {
                                        particle.gotoAndPlay("play");
                                                }
if (ing=="certain") {
                                        certain.gotoAndPlay("play");
                                                }
if (ing=="travelled") {
                                        travelled.gotoAndPlay("play");
                                                }
if (ing=="called") {
                                        called.gotoAndPlay("play");
```

```
                                        }
if (ing=="edge") {
                                edge.gotoAndPlay("play");
                                        }
if (ing=="imaginary") {

        imaginary.gotoAndPlay("play");
                                        }
if (ing=="sufficiently") {

        sufficiently.gotoAndPlay("play");
                                        }
if (ing=="boundary") {

        boundary.gotoAndPlay("play");
                                        }
if (ing=="abrupt") {
                                abrupt.gotoAndPlay("play");
                                        }
if (ing=="chaotic") {
                                chaotic.gotoAndPlay("play");
                                        }
if (ing=="pattern") {
                                pattern.gotoAndPlay("play");
                                        }
if (ing=="important") {
```

```
important.gotoAndPlay("play");
                                        }
if (ing=="leaking") {
                                leaking.gotoAndPlay("play");
                                        }
if (ing=="leaves") {
                                leaves.gotoAndPlay("play");
                                        }
if (ing=="quantitative") {

quantitative.gotoAndPlay("play");
                                        }
if (ing=="conclude") {

conclude.gotoAndPlay("play");
                                        }
if (ing=="principle") {
                                principle.gotoAndPlay("play");
                                        }
if (ing=="implemented") {

implemented.gotoAndPlay("play");
                                        }
if (ing=="determine") {

determine.gotoAndPlay("play");
```

```
                                        }
if (ing=="surface") {
                                surface.gotoAndPlay("play");
                                        }
if (ing=="driven") {
                                driven.gotoAndPlay("play");
                                        }
if (ing=="uniform") {
                                uniform.gotoAndPlay("play");
                                        }
if (ing=="acceleration") {

        acceleration.gotoAndPlay("play");
                                        }
if (ing=="measure") {
                                measure.gotoAndPlay("play");
                                        }
if (ing=="gauges") {
                                gauges.gotoAndPlay("play");
                                        }
if (ing=="altitude") {
                                altitude.gotoAndPlay("play");
                                        }
if (ing=="molecules") {

        molecules.gotoAndPlay("play");
                                        }
```

```
if (ing=="rear") {
                                        rear.gotoAndPlay("play");
                                                }
if (ing=="wing") {
                                        wing.gotoAndPlay("play");
                                                }
if (ing=="piston") {
                                        piston.gotoAndPlay("play");
                                                }
if (ing=="tube") {
                                        tube.gotoAndPlay("play");
                                                }
                        }
if (ing=="conclude") {

        conclude.gotoAndPlay("play");
                                                }
if (ing=="principle") {
                                        principle.gotoAndPlay("play");
                                                }
if (ing=="implemented") {

        implemented.gotoAndPlay("play");
                                                }
if (ing=="determine") {

        determine.gotoAndPlay("play");
```

```
}
```

**F. Action script on Exit Page**

1. Button Back

```
on (release) {
        gotoAndPlay("awal");
}
```

2. Button Exit

```
on (release) {
        fscommand("quit",true);
}
```

## APPENDIX 6

## Video Script of Flow Rate

| Num. | Visualization | Narration |
|---|---|---|
| 1 | **CU.** CAPTION<br>FLOW RATE | Q1. Music |
| 2 | **MS.** PRESENTER | Q2. Music<br>Q3. Hello everyone, today we're going to learn the relation between fluid velocity and cross-sectional area. |
| 3 | **MS.** PRACTICIAN | Q4. Music<br>Q5. This phenomenon is usually seen in daily activities. |
| 4 | **MS.** PRACTICIAN | Q6. Music<br>Q7. Just like when someone is watering a garden or washing a car. |
| 5 | **MS.** PRACTICIAN<br>**CU.** CAPTION<br>OBSERVE THE DIFFERENT FLUID VELOCITY | Q8. Music<br>Q9. Sometimes water can't flow out to the object, and they just pressure the tip hole so that the cross-sectional area become smaller. |
| 6 | **MS.** PRACTICIAN | Q10. Music<br>Q11. This phenomenon is very common in our daily life, but not all people understand the theory behind that phenomenon. |
| 7 | **MS.** PRACTICIAN | Q12. Music<br>Q13. By learning from this video, you're expected to link the relation between cross-sectional area and fluid velocity, then answer the question on this page to get a better clue. |

**APPENDIX 7**

**Video Script of Bernoulli's Principle**

| Num. | Visualization | Narration |
|---|---|---|
| 1 | **CU.** CAPTION<br>BERNOULLI'S PRINCIPLE | Q1. Music |
| 2 | **MS.** PRESENTER | Q2. Hello everyone, today we're going to learn about Bernoulli's Principle. But before that, let's see these video. |
| 3 | **CU.** CAPTION<br>MOVING CANS | Q3. Music |
| 4 | **MS.** PRACTICIAN<br><br>**CU.** CAPTION<br>MENTION THE TOOLS USED BY PRACTICIAN | Q4. Music |
| 5 | **ZOOM** CANS<br><br>**CU.** CAPTION<br>WHAT HAPPEN WHEN PRACTICIAN BLOWS AIR FROM THE STRAW | Q5. Music |
| 6 | **ZOOM IN** CANS<br>**CU.** CAPTION<br>SLOWLY, WATCH THE CANS AGAIN CAREFULLY... | Q6. Music |
| 7 | **CU.** CAPTION | Q7. Music |

| | | |
|---|---|---|
| | THE BALLOONS | |
| 8 | **MS.** PRACTICIAN<br><br>**CU.** CAPTION<br>WHAT TOOLS ARE USED HERE? | Q8. Music |
| 9 | **MS.** PRACTICIAN<br>**CU.** CAPTION<br>OBSERVE THAT THE BALLOONS ARE APPROACHING EACH OTHER | Q9. Music |
| 10 | **CU.** CAPTION<br>IT IS ANOTHER PHENOMENON OF THE BERNOULLI'S PRINCIPLE | Q10. Music |
| 11 | **MS.** PRESENTER | Q11. Music<br>Q12. Well, what do you think about that. How could those cans or balloons move? What makes the collision happens? Well, here is another video that you may try it. |
| 12 | **CU.** CAPTION<br>FLOATING BALL | Q13. Music |
| 13 | **MS.** PRACTICIAN<br><br>**CU.** CAPTION<br>OBSERVE THE FLOATING BALL ABOVE THE STRAW | Q14. Music |
| 14 | **ZOOOM IN** PRESENTER | Q15. Music |
| 15 | **CU.** CAPTION | Q16. Music |

| | | |
|---|---|---|
| | IT HAS THE SAME PRINCIPLE WITH THIS ONE | |
| 16 | **MS.** BALL AND TAP<br><br>**CU.** CAPTION<br>OBSERVE THE BALL WHEN THE TAP IS OPENED | Q17. Music |
| 17 | **MS.** PRESENTER | Q18. Music<br>Q19. Well, it just another phenomenon. You can try it, and guess what makes the ball floating, or how could the water stream keeps the ball in their stable line? You can type your answer based on the question provided in this page. |
| 18 | **CU.** CAPTION<br>YOU CAN FIND ANOTHER PHENOMENA ARROUND OF YOU. SEARCH, AND TELL THE CLASS. | Q20. Music |
| 19 | **CU.** CAPTION<br>PHYSICS IS FUN! | Q21. Music |

**APPENDIX 8**
**Video Script of Torricelli's Principle**

| Num. | Visualization | Narration |
|---|---|---|
| 1 | **MS.** PRESENTER<br><br>**CU.** CAPTION IGNATIO BENIGNO THE APPLICATION OF BERNOULLI IN TORRICELLI'S PRINCIPLE | Q1. Music<br>Q2. Hi everyone, in this time we're going to learn about Torricelli's Principle. But before that, lets see this daily tools. |
| 2 | **MS.** WATER TANK | Q3. Music<br>Q4. A water tank is a container for storing water. It provides storage water for drinking water, irigation agriculture, fire surpression, farming for plant and livestock, as well as many other application. |
| 3 | **MS.** WATER TANK | Q5. Music<br>Q6. Water tank parameters include the general design of water tank. Various material are used in making of water tank. Such as plastics, fiber glass, stone, even steel. A water tank is used for storing in any condition, even when the electricity is out. |
| 4 | **MS.** PRESENTER | Q7. Music<br>Q8. Well, this day phenomenon is water tank that can be used for storing water. And behind of me there are water tanks that can be use and installed above building. Now, lets see. |

| | | |
|---|---|---|
| 5 | **CU.** CAPTION $4^{TH}$ FLOOR OF BUILDING | Q9. Music |
| 6 | **MS.** PRESENTER | Q10. Music<br>Q11. Ok, now we're in the $4^{th}$ floor in this building. And in this chance, we're going to see the fluid's velocity that is coming out from the washbin. Come on! |
| 7 | **PAN RIGHT.** PRESENTER TO WASHBIN | Q12. Music<br>Q13. Now lets see at this fluid velocity that is coming out from this tap. |
| 8 | **ZOOM IN** WASHBIN | Q14. Music |
| 9 | **MS.** PRESENTER | Q15. Music<br>Q16. Lets see the fluid velocity that is coming out from the tap, at the $3^{rd}$ floor. |
| 10 | **CU.** CAPTION $3^{RD}$ FLOOR OF BUILDING | Q17. Music |
| 11 | **PAN RIGHT.** PRESENTER TO WASHBIN | Q18. Music<br>Q19. Ok so now here at the 3rd floor, and lets see the fluid velocity that is coming out from the washbin. |
| 12 | **MS.** PRESENTER | Q20. Music<br>Q21. It has a greater velocity. And how about at the second and first floor. So come on, lets see! |
| 13 | **CU.** CAPTION | Q22. Music |

| | | |
|---|---|---|
| | $2^{ND}$ FLOOR OF BUILDING | |
| 14 | **MS.** PRESENTER | Q23. Music<br>Q24. Now we're here at the second floor in this building. And this is the washbin. |
| 15 | **ZOOM IN** WASHBIN | Q25. Music |
| 16 | **MS.** PRESENTER | Q26. Music<br>Q27. Well, how about at the first floor? Come on. |
| 17 | **CU.** CAPTION $1^{ST}$ FLOOR OF BUILDING | Q28. Music |
| 18 | **MS.** PRESENTER | Q29. Music<br>Q30. Ok, now we're at the first floor. At this time, lets compare the fluid velocity that coming out from the tap. |
| 19 | **ZOOM IN** WASHBIN | Q31. Music |
| 20 | **MS.** PRESENTER | Q32. Music<br>Q33. And as you can see, in this floor, they have a greater fluid velocity. |
| 21 | **CU.** CAPTION COMPARATION FRIST FLOOR – FOURTH FLOOR | Q34. Music |
| 22 | **MS.** PRESENTER | Q35. Music<br>Q36. Well so this is our case for today. Now its time to show your understanding and give your opinion based on the question that is provided in this page. |

## APPENDIX 9
## Video Script of Venturimeter

| Num. | Visualization | Narration |
|---|---|---|
| 1 | **CU.** CAPTION<br>VENTURIMETER | Q1. Music |
| 2 | **MS.** PRESENTER | Q2. Music<br>Q3. Hello everyone, today we're going to learn Venturi tube which used Bernoulli's Principle. Lets check this video. |
| 3 | **CU.** CAPTION<br>AN AQUARIUM | Q4. Music<br>Q5. Aquarium is a glass container which fish or other water animals can be kept. |
| 4 | **CU.** CAPTION<br>AQUARIUMS NEED OXYGEN TO BE SUPPLIED | Q6. Music<br>Q7. However, those animals need oxygen to live, so that there must be oxygen supply on aquarium. |
| 5 | **ZOOM IN.** VINYL TUBE<br><br>**CU.** CAPTION<br>A VINYL TUBE IS PREPARED | Q8. Music<br>Q9. In this video you can see that a vinyl tube is prepared, and installed on a venturi pipe. The tube can help the venturi pipe supplies more oxygen. |
| 6 | **ZOOM IN.** VENTURI PIPE | Q10. Music<br>Q11. The tube can be set into produce much bubbles or few bubbles which depends on the oxygen needed. |
| 7 | **MS.** PRESENTER | Q12. Well, by learning from that video, and linking to the Bernoulli's Principle, you can understand more by answer some questions that is provided in this page. |

## APPENDIX 10

## Video Script of Lift Force on Airplane

| Num. | Visualization | Narration |
|---|---|---|
| 1 | **CU.** CAPTION<br>LIFT FORCE ON<br>AIRPLANE | Q1. Music |
| 2 | **MS.** PRESENTER | Q2. Music<br>Q3. Hi everyone, this time we're going to learn Bernoulli's Principle that used in Airplane. Airplane is a massive air transportation, used for transporting passengers and cargo, inside country even abroad. |
| 3 | **CU.** CAPTION<br>AIRPLANES NEED LARGE AREA OF AIRPORT | Q4. Music<br>Q5. However, airplanes require large area of airport for take-off and landing purpose. |
| 4 | **CU.** CAPTION<br>AIRPLANES NEED VELOCITY BEFORE TAKE OFF | Q6. Music<br>Q7. In this case, airplanes need a substantial velocity so that they have a lift Force. |
| 5 | **CU.** CAPTION<br>AIRPLANES ON SKY | Q8. Music<br>Q9.Nowadays, airplanes are modern transportation, because they can brings many passengers through the sky. |
| 6 | **CU.** CAPTION<br>AIRPLANES NEED JET AND WINGS | Q10. Music<br>Q11.Airplanes need jet and wings so that they can work. However this parts |

| | | |
|---|---|---|
| | | have a different function. |
| 7 | **CU.** CAPTION<br>A LANDING AIRPLANE | Q12. Music<br>Q13. Jet on the airplanes is required to create a forward force, and wings is needed for the lift force. |
| 8 | **CU.** CAPTION<br>TAKE OFF - LANDING | Q14. Music<br>Q15. In this video you can also see the difference of the wing's flap when the airplanes take off or landing. |
| 9 | **MS.** PRACTICIAN<br><br>**CU.** CAPTION<br>PRACTICE BY YOUR OWN | Q16. Music<br>Q17.You can relate this phenomenon by your own way of practicing. With a piece of paper on your hand, blow the paper on top of it, then you will find that the paper will be lifted. |
| 10 | **MS.** PRESENTER | Q18. Music<br>Q19.After you try it, think again the relation between Bernoulli's principle and airplanes' lift force through questions that have been available on this page. |

## APPENDIX 11
## Video Script of Mosquito Sprayer

| Num. | Visualization | Narration |
|---|---|---|
| 1 | **CU.** CAPTION<br>MOSQUITO SPRAYER | Q1. Music |
| 2 | **MS.** PRESENTER | Q2. Music<br>Q3. Hello everyone, today we're going to learn another tools that used Bernoulli's Principle, Mosquito Sprayers. |
| 3 | **MS.** PRACTICIAN | Q4. Music<br>Q5. Mosquito sprayers, is a tool that usually used in rural country for preventing mosquito. |
| 4 | **MS.** PRACTICIAN | Q6. Music<br>Q7. Mosquito sprayers has been used widely, especially in Indonesian country which has tropics climate. |
| 5 | **ZOOM IN.** MOSQUITO SPRAYER<br><br>**CU.** CAPTION<br>OBSERVE HOW THE MOSQUITO SPRAYER WORKS. | Q8. Music<br>Q9. Then what is the relationship between Bernoulli's Principle and this tools? Which part of this sprayers that use Bernoulli's principle? |
| 6 | **MS.** PRESENTER | Q10. Music<br>Q11. Along with all knowledge you've got about Bernoulli's Principle, I'm sure that you can answer some questions that is provided in this page. |
| 7 | **CU.** CAPTION<br>PHYSICS IS FUN! | Q12. Music |

# APPENDIX 12

# LEMBAR VALIDASI AHLI MEDIA

## LEMBAR VALIDASI AHLI MEDIA

**Developing Physics Bilingual Learning Media "VOCARELI" on Fluid Dynamics for Senior High School Students**

Lembar evaluasi ini dimaksudkan untuk memberikan skala penilaian media oleh validator sebagai ahli media. Silahkan lengkapi pernyataan berikut dengan memberi tanda centang (✓) pada :

| No. | Aspek Penilaian | Skala | | | |
|---|---|---|---|---|---|
| | | 4 | 3 | 2 | 1 |
| A | **Kualitas Tampilan dan Media** | | | | |
| | 1. Icon membantu pengguna dalam menggunakan program | ✓ | | | |
| | 2. Konsistensi bentuk dan tata letak halaman media pembelajaran | | ✓ | | |
| | 3. Kesesuaian penggunaan warna teks, jenis huruf dan juga background pada media | | ✓ | | |
| | 4. Kesesuaian proporsi gambar yang disajikan dengan tampilan media pembelajaran | | ✓ | | |
| | 5. Animasi dan video yang ada menyampaikan konsep kompleks secara visual dan dinamis, serta kejelasan animasi menjelaskan konsep materi | | ✓ | | |
| | 6. Kreatif dalam menuangkan ide dan gagasan | ✓ | | | |
| | 7. Penyajian pesan dalam media pembelajaran memudahkan siswa untuk memahami isi materi | | ✓ | | |
| B | **Rekayasa Perangkat Lunak** | | | | |
| | 8. Kemudahan dan kesederhanaan dalam pengoperasian | ✓ | | | |
| | 9. Menu dan petunjuk pengoperasian cukup membantu | ✓ | | | |
| | 10. Petunjuk penggunaan dalam media sesuai dengan cara penggunaan media | ✓ | | | |
| **Skor** | | 20 | 15 | | |
| **Total** | | 35 | | | |
| **Rata-Rata** | | 3,5 | | | |

Validator

Anthony Wijaya, S.Pd., M.Si.

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## PENJABARAN SKALA PENILAIAN VALIDASI MEDIA

| No. | Indikator | Kriteria Penilaian |
|---|---|---|
| 1 | Icon membantu pengguna dalam menggunakan program | 1. Jika icon dalam media pembelajaran merugikan penggunaan program.<br>2. Jika icon dalam media pembelajaran mengganggu penggunaan program.<br>3. Jika icon dalam media pembelajaran membantu penggunaan program.<br>4. Jika icon dalam media pembelajaran sangat membantu penggunaan program. |
| 2 | Konsistensi bentuk dan tata letak halaman media pembelajaran | 1. Jika bentuk dan tata letak halaman media selalu berbeda.<br>2. Jika bentuk dan tata letak halaman media terkadang berubah tidak menentu.<br>3. Jika bentuk dan tata letak halaman media tertata cukup konsisten<br>4. Jika bentuk dan tata letak halaman media konsisten |
| 3 | Kesesuaian penggunaan warna teks, jenis huruf dan juga background pada media | 1. Jika penggunaan warna teks, jenis huruf dan background tidak sesuai dan tidak menarik<br>2. Jika penggunaan warna teks, jenis huruf dan background kurang sesuai dan kurang menarik<br>3. Jika penggunaan warna teks, jenis huruf dan background cukup sesuai dan menarik<br>4. Jika penggunaan warna teks, jenis huruf dan background sangat sesuai dan menarik |
| 4 | Kesesuaian proporsi gambar yang disajikan dengan tampilan media pembelajaran | 1. Jika proporsi gambar yang disajikan tidak sesuai dengan tampilan media pembelajaran<br>2. Jika proporsi gambar yang disajikan kurang sesuai dengan tampilan media pembelajaran<br>3. Jika proporsi gambar yang disajikan sesuai dengan tampilan media pembelajaran<br>4. Jika proporsi gambar yang disajikan sangat sesuai dengan tampilan media pembelajaran |
| 5 | Animasi dan video yang ada menyampaikan konsep kompleks secara visual dan dinamis, serta kejelasan animasi menjelaskan konsep materi | 1. Jika proporsi animasi dan video tidak ada yang menyampaikan konsep secara visual dan dinamis<br>2. Jika proporsi animasi dan video kurang menyampaikan konsep secara visual dan dinamis<br>3. Jika proporsi animasi dan video menyampaikan konsep secara visual dan dinamis<br>4. Jika proporsi animasi dan video menyampaikan konsep secara visual dan dinamis dengan sangat baik. |
| 6 | Kreatif dalam menuangkan ide dan gagasan | 1. Jika penuangan ide dan gagasan tidak kreatif<br>2. Jika penuangan ide dan gagasan cukup kreatif |

| | | |
|---|---|---|
| | | 3. Jika penuangan ide dan gagasan kreatif<br>4. Jika penuangan ide dan gagasan sangat kreatif |
| 7 | Penyajian pesan dalam media pembelajaran memudahkan siswa untuk memahami isi materi | 1. Jika penyampaian pesan dalam media pembelajaran tidak memudahkan siswa memahami isi materi<br>2. Jika penyampaian pesan dalam media pembelajaran cukup memudahkan siswa memahami isi materi<br>3. Jika penyampaian pesan dalam media pembelajaran dapat memudahkan siswa memahami isi materi<br>4. Jika penyampaian pesan dalam media pembelajaran sangat memudahkan siswa memahami isi materi |
| 8 | Kemudahan dan kesederhanaan dalam pengoperasian | 1. Jika pengoperasian program menyulitkan pengguna<br>2. Jika pengoperasian program cukup menyulitkan pengguna<br>3. Jika pengoperasian program mudah dan sederhana<br>4. Jika pengoperasian program sangat mudah dan sederhana |
| 9 | Menu dan petunjuk pengoperasian cukup membantu | 1. Jika menu dan petunjuk pengoperasian program tidak jelas<br>2. Jika menu dan petunjuk pengoperasian program cukup jelas<br>3. Jika menu dan petunjuk pengoperasian program jelas<br>4. Jika menu dan petunjuk pengoperasian program sangat jelas |
| 10 | Petunjuk penggunaan dalam media sesuai dengan cara penggunaan media | 1. Jika petunjuk penggunaan dalam media tidak sesuai<br>2. Jika petunjuk penggunaan dalam media cukup sesuai<br>3. Jika petunjuk penggunaan dalam media sesuai<br>4. Jika petunjuk penggunaan dalam media sangat sesuai |